May 15, 2003

L-PI-03-051
PI TS 5.6.2
ISFSI TS 6.2

U S Nuclear Regulatory Commission
ATTN: Document Control Desk
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PRAIRIE ISLAND NUCLEAR GENERATING PLANT
DOCKETS 50-282, 50-306 AND 72-10
LICENSE Nos. DPR-42, DPR-60 AND SNM-2506

2002 ANNUAL RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT

Pursuant to Prairie Island Nuclear Generating Plant Technical Specification (PI TS) 5.6.2, Appendix A to Operating Licenses DPR-42 and DPR-60, and pursuant to Prairie Island Independent Spent Fuel Storage Installation Technical Specification (ISFSI TS) 6.2, Appendix A to Materials License DNM-2506, the Nuclear Management Company, LLC submits one copy of the Annual Radiological Environmental Monitoring Report for the period January 1, 2002 through December 31, 2002.

This letter contains no new commitments and no revisions to existing commitments. Please address any comments or questions regarding this letter to Mr. Dale Vincent at 651-388-1121.

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Attachment: Annual report to the United States Nuclear Regulatory Commission, Radiation Environmental Monitoring Program, January 1 through December 31, 2002

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XCEL ENERGY CORPORATION

PRAIRIE ISLAND NUCLEAR GENERATING PLANT

Docket No.	50-282	License No.	DPR-42
	50-306		DPR-60
ISFSI			
Docket No.72-10			SNM-2506

ANNUAL REPORT TO THE UNITED STATES NUCLEAR REGULATORY COMMISSION

Radiation Environmental Monitoring Program

January 1 to December 31, 2002

Prepared under Contract by

ENVIRONMENTAL, Inc.
MIDWEST LABORATORY

Project No. 8010

Approved: _____

Bronia Grob, M.S.
Laboratory Manager

PREFACE

The staff of Environmental, Inc., Midwest Laboratory was responsible for the acquisition of data presented in this report. Samples were collected by members of the staff of the Prairie Island Nuclear Generating Plant, operated by Nuclear Management Company, LLC for XCEL Energy Corporation. The report was prepared by Environmental, Inc., Midwest Laboratory.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

This report summarizes and interprets results of the Radiation Environmental Monitoring Program (REMP) conducted by Environmental, Inc., Midwest Laboratory at the Prairie Island Nuclear Generating Plant, Red Wing, Minnesota, during the period January - December, 2002. This program monitors the levels of radioactivity in the air, terrestrial, and aquatic environments in order to assess the impact of the plant on its surroundings.

Tabulations of the individual analyses made during the year are not included in this report. These data are included in a reference document (Environmental, Inc., Midwest Laboratory, 2003b) available at Prairie Island Nuclear Generating Plant.

Prairie Island Nuclear Generating Plant is located on the Mississippi River in Goodhue County, Minnesota, owned by Xcel Energy Corporation and operated by Nuclear Management Company, LLC. The plant has two 575 MWe pressurized water reactors. Unit 1 achieved initial criticality on 1 December 1973. Commercial operation at full power began on 16 December 1973. Unit 2 achieved initial criticality on 17 December 1974. Commercial operation at full power began on 21 December 1974.

2.0 SUMMARY

The Radiation Environmental Monitoring Program (REMP) required by the U.S. Nuclear Regulatory Commission (NRC) Technical Specifications for the Prairie Island Nuclear Generating Plant and the Independent Spent Fuel Storage Installation (ISFSI) is described. Results for 2002 are summarized and discussed.

Program findings show background levels of radioactivity in the environmental samples collected in the vicinity of the Prairie Island Nuclear Generating Plant.

3.0 RADIATION ENVIRONMENTAL MONITORING PROGRAM (REMP)

3.1 Program Design and Data Interpretation

The purpose of the Radiation Environmental Monitoring Program (REMP) at the Prairie Island Nuclear Generating Plant is to assess the impact of the plant on its environment. For this purpose, samples are collected from the air, terrestrial, and aquatic environments and analyzed for radioactive content. In addition, ambient gamma radiation levels are monitored by thermoluminescent dosimeters (TLDs).

Sources of environmental radiation include the following:

(1) Natural background radiation arising from cosmic rays and primordial radionuclides;

(2) Fallout from atmospheric nuclear detonations;

(3) Releases from nuclear power plants;

(4) Industrial and medical radioactive waste; and

(5) Fallout from nuclear accidents.

In interpreting the data, effects due to the plant must be distinguished from those due to other sources.

A major interpretive aid in assessment of these effects is the design of the monitoring program at the Prairie Island Plant which is based on the indicator-control concept. Most types of samples are collected both at indicator locations (nearby, downwind, or downstream) and at control locations (distant, upwind, or upstream). A plant effect would be indicated if the radiation level at an indicator location was significantly larger than that at the control location. The difference would have to be greater than could be accounted for by typical fluctuations in radiation levels arising from other sources.

An additional interpretive technique involves analyses for specific radionuclides present in the environmental samples collected from the plant site. The plant's monitoring program includes analyses for tritium and iodine-131. Most samples are also analyzed for gamma-emitting isotopes with results for the following groups quantified: zirconium-95, cesium-137, cerium-144, beryllium-7, and potassium-40. The first three gamma-emitting isotopes were selected as radiological impact indicators because of the different characteristic proportions in which they appear in the fission product mix produced by a nuclear reactor and that produced by a nuclear detonation. Each of the three isotopes is produced in roughly equivalent amounts by a reactor: each constitutes about 10% of the total activity of fission products 10 days after reactor shutdown. On the other hand, 10 days after a nuclear explosion, the contributions of zirconium-95, cerium-144, and cesium-137 to the activity of the resulting debris are in the approximate ratio 4:1:0.03 (Eisenbud, 1963). Beryllium-7 is of cosmogenic origin and potassium-40 is a naturally-occurring isotope. They were chosen as calibration monitors and should not be considered radiological impact indicators.

The other group quantified consists of niobium-95, ruthenium-103 and -106, cesium-134, barium-lanthanum-140, and cerium-141. These isotopes are released in small quantities by nuclear power plants, but to date their major source of injection into the general environment has been atmospheric nuclear testing. Nuclides of the final group, manganese-54, iron-59, cobalt-58 and -60, and zinc-65, are activation products and arise from activation of corrosion products. They are typical components of a nuclear power plant's effluents, but are not produced in significant quantities by nuclear detonations.

3.1 Program Design and Data Interpretation (continued)

Other means of distinguishing sources of environmental radiation are employed in interpreting the data. Current radiation levels are compared with previous levels, including those measured before the Plant became operational. Results of the plant's monitoring program can be related to those obtained in other parts of the world. Finally, results can be related to events known to cause elevated levels of radiation in the environment, e.g., atmospheric nuclear detonations.

3.2 Program Description

The sampling and analysis schedule for the radiation environmental monitoring program at Prairie Island is summarized in Table 5.1 and briefly reviewed below. Table 5.2 defines the sampling location codes used in Table 5.1 and specifies for each location its type (indicator or control) and its distance, direction, and sector relative to the reactor site or ISFSI facility, as appropriate. To assure that sampling is carried out in a reproducible manner, detailed sampling procedures have been prescribed (Prairie Island Nuclear Generating Plant, 2002). Maps of fixed sampling locations are included in Appendix D.

To monitor the air environment, airborne particulates are collected on membrane filters by continuous pumping at five locations. Airborne iodine is collected by continuous pumping through charcoal filters at these same locations. Filters are changed and counted weekly. Particulate filters are analyzed for gross beta activity and charcoal filters for iodine-131. A quarterly composite of the particulate filters from each location is gamma-scanned on an HPGe detector. One of the five locations is a control (P-1), and four are indicators (P-2, P-3, P-4, and P-6).

Offsite ambient gamma radiation is monitored at thirty-four locations, using $CaSO_4$:Dy dosimeters with four sensitive areas at each location: ten in an inner ring in the general area of the site boundary, fifteen in the outer ring within a 4-5 mile radius, eight at special interest locations, and one control location, 11.1 miles distant from the plant. They are replaced and measured quarterly. Also, a complete emergency set of TLDs for the inner ring, outer ring and special interest locations are placed in the field at the same time as regular sets. The emergency set is returned to EIML quarterly for annealing and repackaging.

Ambient gamma radiation is monitored at the Independent Spent Fuel Storage Installation (ISFSI) Facility by twenty $CaSO_4$:Dy dosimeters. Twelve dosimeters are located inside of the earthen berm in direct line of sight from the storage casks and eight dosimeters are located outside of the earthen berm. They are replaced and measured quarterly.

Milk samples are collected monthly from five farms (four indicator and one control) and analyzed for iodine-131 and gamma-emitting isotopes. The milk is collected biweekly during the growing season (May - October), because the milk animals may be on pasture.

For additional monitoring of the terrestrial environment, green leafy vegetables (cabbage) are collected annually from the highest D/Q garden and a control location (P-38), and analyzed for gamma-emitting isotopes, including iodine-131. Corn is collected annually only if fields are irrigated with river water and analyzed for gamma-emitting isotopes. Well water and ground water are collected quarterly from four locations near the plant and analyzed for tritium and gamma-emitting isotopes.

River water is collected weekly at two locations, one upstream of the plant (P-5) and one downstream (P-6, Lock and Dam No.3). Monthly composites are analyzed for gamma-emitting isotopes. Quarterly composites are analyzed for tritium.

3.2 Program Description (continued)

Drinking water is collected weekly from the City of Red Wing well. Monthly composites are analyzed for gross beta, iodine-131, and gamma-emitting isotopes. Quarterly composites are analyzed for tritium.

The aquatic environment is also monitored by semi-annual upstream and downstream collections of fish, periphyton or invertebrates, and bottom sediments. Shoreline sediment is collected semi-annually from one location. All samples are analyzed for gamma-emitting isotopes.

3.3 Program Execution

The Program was executed as described in the preceding section with the following exceptions:

(1) A partial air particulate/air iodine sample was obtained from location P-4 for the week ending 08-07-02. The probable cause is power loss due to storm activity.

(2) No air particulate/air iodine sample was available from location P-2 for the week ending 11-26-02, due to sampler pump failure.

(3) Milk samples were not available from P-37 (Welsch Farm) after October 29, 2002. Dairy operations have been temporarily discontinued till spring, 2003.

Deviations from the program are summarized in Table 5.3.

3.4 Laboratory Procedures

All iodine-131 analyses in milk and drinking water were made by using a sensitive radiochemical procedure which involves separation of the element by use of an ion-exchange resin and subsequent beta counting. All gamma-spectroscopic analyses were performed with HPGe detectors. Levels of airborne iodine-131 in charcoal samples were measured by gamma spectrometry.

Levels of iodine-131 in cabbage were determined by gamma spectrometry.

Tritium levels were determined by liquid scintillation technique.

Analytical Procedures used by Environmental, Inc. are on file and are available for inspection. Procedures are based on those prescribed by the Health and Safety Laboratory of the U.S. Dep't of Energy, Edition 28, 1997, U.S. Environmental Protection Agency for Measurement of Radioactivity in Drinking Water, 1980, and the U.S. Environmental Protection Agency, EERF, Radiochemical Procedures Manual, 1984.

Environmental, Inc., Midwest Laboratory has a comprehensive quality control/quality assurance program designed to assure the reliability of the data obtained. Details of the Quality Assurance Program are presented elsewhere (Environmental, Inc., Midwest Laboratory, 2000). The program includes participation in Interlaboratory Comparison (Crosscheck) programs and results are presented in Appendix A.

3.5 Program Modifications

There were no program modifications for the year, 2002.

3.6 Land Use Census

In accordance with the Prairie Island Nuclear Generating Plant Offsite Dose Calculation Manual, H4, (ODCM) a land use census is conducted in order to identify the location of the nearest milk animal, the nearest residence, and the nearest garden of greater than 500 ft^2 producing fresh leafy vegetables in each of the 16 meteorological sectors within a distance of 5 miles. This census is conducted at least once per 12 months between the dates of May 1 and October 31. If new locations yield a calculated dose or dose equivalent (via the same exposure pathway) twenty percent greater than the required locations per the ODCM, then the new locations are added to the radiation environmental monitoring program within 30 days, and sampling locations having lower calculated doses or a lower dose commitment may be deleted from this monitoring program after October 31 of the year in which the land use census was conducted.

This land use census insures the updating of the radiation environmental monitoring program should sampling locations change within the 5 mile radius from the plant.

The 2002 Land Use Census was completed in October, 2002. There were no changes in any of the highest D/Q locations for dairy, nearest residence, or garden sites in 2002. The critical receptor location did not change in 2002, based on the results of the land use census.

No downstream irrigation of corn was discovered within 5 miles of the Prairie Island Plant. Therefore, no corn samples were collected for analysis.

4.0 RESULTS AND DISCUSSION

All scheduled collections and analyses were made except those listed in Table 5.3.

The results are summarized in Table 5.4 in a format recommended by the Nuclear Regulatory Commission in Regulatory Guide 4.8. For each type of analysis of each sampled medium, this table lists the mean and range for all indicator locations and for all control locations. The locations with the highest mean and range are also shown.

4.1 Atmospheric Nuclear Detonations and Nuclear Accidents

There were no reported atmospheric nuclear tests in 2002. The last reported test was conducted on October 16, 1980 by the People's Republic of China. There were no reported accidents involving a release to the environment at nuclear reactor facilities in 2002.

4.2 Summary of Preoperational Data

The following constitutes a summary of preoperational studies conducted at the Prairie Island Nuclear Power Plant during the years 1970 to 1973, to determine background levels expected in the environment, and provided, where applicable, as a means for comparison with present day levels. Strict comparisons, however, are difficult, since background levels of radiation were much higher in these years due to radioactive fallout from the atmosphere. Gross beta measurements in fallout declined yearly from a level of 12,167 pCi/m^2 to 1,020 pCi/m^2, and these declining values are reflected throughout the various media tested.

In the air environment, ambient gamma radiation (TLDs) averaged 9.4 mR/4 weeks during preoperational studies. Gross beta in air particulates declined from levels of 0.38 to 0.037 pCi/m^3. Average present day levels have stabilized at around 0.025 pCi/m^3. Airborne radioiodine remained below detection levels.

In the terrestrial environment of 1970 to 1973, milk, agricultural crops, and soil were monitored. In milk samples, low levels of Cs-137, I-131, and Sr-90 were detected. Cs-137 levels declined from 16.5 to 8.6 pCi/L. Present day measurements for both Cs-137 and I-131 are below detection levels. Agricultural crop measurements averaged 57.7 pCi/g for gross beta and 0.47 pCi/g for Cs-137. Gross beta measured in soil averaged 52 pCi/g .

The aqueous environment was monitored by testing of river , well and lake waters, bottom sediments, fish , aquatic vegetation and periphyton. Specific location comparison of drinking, river and well water concentrations for tritium and gross beta are not possible. However, tritium background levels, measured at eight separate locations, declined steadily from an average concentration of 1020 pCi/L to 490 pCi/L. Present day environmental levels of tritium are below detection limits. Values for gross beta, measured from 1970 to 1973, averaged 9.9 pCi/L in downstream Mississippi River water, 8.2 pCi/L for well water, and 11.0 pCi/L for lake water. Gamma emitters were below the lower limit of detection (LLD). In bottom sediments, gross beta background levels were determined at 51.0 pCi/g. Cs-137 activity during preoperational studies in 1973 measured 0.25 pCi/g upstream and 0.21 pCi/g downstream. The lower levels occasionally observed today can still be attributed to residual activity from atmospheric fallout. Gross beta in fish, measured in both flesh and skeletal samples, averaged 7.3 and 11.7 pCi/g, respectively. Gross beta background levels in aquatic vegetation, algae and periphyton samples measured 76.0 pCi/g , 46.0 pCi/g, and 13.6 pCi/g, respectively.

4.3 Program Findings

Results obtained show background levels of radioactivity in the environmental samples collected in the vicinity of the Prairie Island Nuclear Generating Plant in 2002.

Ambient Radiation (TLDs)

Ambient radiation was measured in the general area of the site boundary, at the outer ring 4 - 5 mi distant from the Plant, at special interest areas and at one control location. The means ranged from 16.9 mR/91 days at inner ring locations to 17.8 mR/91 days at outer ring locations. The mean at special locations was 16.2 mR/91 days and 16.9 mR/91 days at the control location. The dose rates measured at the inner and outer ring and the control locations were similar to those observed from 1987 through 2001. The results are tabulated below. No plant effect on ambient gamma radiation was indicated (Figure 5-1).

Year	Average (Inner and Outer Rings)	Control
1987	16.9	17.0
1988	15.4	16.0
1989	16.5	16.7
1990	15.9	16.3
1991	14.9	14.5
1992	16.3	14.8
1993	15.9	15.4
1994	15.2	16.0
1995	15.6	16.6
1996	14.8	16.4
1997	15.1	16.0
1998	16.7	17.3
1999	16.6	17.5
2000	17.0	17.1
2001	16.8	17.2
2002	17.4	16.9

Ambient gamma radiation as measured by thermoluminescent dosimetry.
Average quarterly dose rates (mR/91 days).

ISFSI Facility Operations Monitoring

Ambient radiation was measured inside the ISFSI earth berm, outside the ISFSI earth berm and at two special locations between the plant ISFSI and the Prairie Island Indian Community. The mean dose rates measured 87.6 mR/91 days inside the ISFSI earth berm and 20.1 mR/91 days outside the ISFSI earth berm. Three additional casks were placed on the ISFSI pad in 2002 for a total of seventeen loaded casks. The higher levels inside the earth berm are expected, due to the loaded spent fuel casks being in direct line-of-sight of the TLDs. The ambient radiation levels measured outside the earth berm show a slight increase as compared to other offsite dose rates around the plant. If the dose rates outside the earth berm are an indication of gamma skyshine from the casks, they are consistent with predictions given in the ISFSI Safety Analysis Report, Table 7A-7, "Total Skyshine Dose Rate". The cumulative average of the two special Prairie Island Indian Community TLDs measured 15.9 and 15.3 mR/91 days. Although the skyshine neutron dose rates are not directly measured, the neutron levels measured next to the casks are below the levels predicted in the ISFSI SAR Report, Table 7A-4, "TN-40 Dose Rates at Short Distances". Therefore, the skyshine dose rates at farther distances from the casks should be at or below the calculated dose rates. No spent fuel storage effect on offsite ambient gamma radiation was indicated (Fig. 5-1).

Airborne Particulates

The average annual gross beta concentrations in airborne particulates were slightly higher at the indicator versus the control locations (0.028 pCi/m^3 and 0.023 pCi/m^3, respectively) and similar to levels observed from 1987 through 2001. The results are tabulated below.

Year	Average of Indicators	Control
	Concentration (pCi/m^3)	
1987	0.024	0.023
1988	0.030	0.030
1989	0.028	0.027
1990	0.024	0.023
1991	0.025	0.025
1992	0.023	0.021
1993	0.022	0.019
1994	0.022	0.022
1995	0.022	0.022
1996	0.023	0.020
1997	0.021	0.021
1998	0.022	0.018
1999	0.024	0.022
2000	0.025	0.025
2001	0.023	0.023
2002	0.028	0.023

Average annual gross beta concentrations in airborne particulates.

A spring peak in beta activity had been observed almost annually for many years (Wilson *et al.*, 1969). It had been attributed to fallout of nuclides from the stratosphere (Gold *et al.*, 1964). It was pronounced in 1981, occurred to a lesser degree in 1982, and has not occurred since 1983. The highest averages for gross beta occur during the months of January and December, and the first and fourth quarters, as in 1985 through 2002.

Two pieces of evidence indicate conclusively that the elevated activity observed during the winter months was not attributable to the Plant operation. In the first place, elevated activity of similar size occurred simultaneously at both indicator and control locations. Secondly, an identical pattern was observed at the Monticello Nuclear Generating Plant, about 100 miles distant from the Prairie Island Nuclear Generating Plant (Xcel Energy Corp., 2003).

Gamma spectroscopic analysis of quarterly composites of air particulate filters yielded similar results for indicator and control locations. Beryllium-7, which is produced continuously in the upper atmosphere by cosmic radiation (Arnold and Al-Salih, 1955), was detected in all samples. All other gamma-emitting isotopes were below their respective LLD limits.

Airborne Iodine

Weekly levels of airborne iodine-131 were below the lower limit of detection (LLD) of 0.07 pCi/m^3 in all samples. There was no indication of a plant effect.

Milk

Iodine-131 results were below the detection limit of 1.0 pCi/L in all samples. Cs-137 results were below the LLD level of 15 pCi/L in all samples. No other gamma-emitting isotopes, except naturally-occurring potassium-40, were detected in any milk samples. This is consistent with the findings of the National Center for Radiological Health that most radiocontaminants in feed do not find their way into milk due to the selective metabolism of the cow. The common exceptions are radioisotopes of potassium, cesium, strontium, barium, and iodine (National Center for Radiological Health, 1968).

In summary, the milk data for 2002 show no radiological effects of the plant operation.

Drinking Water

In drinking water from the City of Red Wing well, tritium activity measured below the LLD level of 182 pCi/L in all samples.

Gross beta concentrations averaged 8.7 pCi/L throughout the year, ranging from 5.8 – 10.8 pCi/L. These concentrations were similar to or slightly higher than levels observed from 1987 through 2001. The most likely contribution is the relatively high levels of naturally-occurring radium. Gamma spectroscopy indicates the presence of lead and bismuth isotopes, which are daughters of the radium decay chain. There is no indication from the 2002 data of any effect of plant operation.

Year		Gross Beta (pCi/L)
1987		7.9
1988		8.0
1989		7.0
1990		7.0
1991		8.0
1992		7.6
1993		7.5
1994		5.8
1995		3.9
1996		6.3
1997		5.1
1998		5.4
1999		5.3
2000		10.1
2001		8.3
2002		8.7

Average annual concentrations; Gross beta in drinking water.

River Water

For all upstream and downstream collections, quarterly composite tritium levels measured below the LLD level of 164 pCi/L. Gamma-emitting isotopes were below detection limits in all samples.

Well Water

Tritium was detected in one quarterly (4th quarter) well water composite (P-24, Suter), at a concentration of 219 pCi/L. This is well below the Environmental Protection Agency's drinking water standard of 20,000 pCi/L. At the control well P-41, Huppert Farm and the three indicator wells (P-8, Community Center, P-6, Lock and Dam No. 3, P-9, Plant Well No. 2) no tritium was detected above the LLD level of 156 pCi/L.

Gamma-emitting isotopes were below detection limits in all samples.

Crops

Two samples of broadleaf vegetation, cabbage leaves, were collected in August and analyzed for gamma-emitting isotopes, including iodine-131. The I-131 level was below 0.008 pCi/g wet weight in both samples. With the exception of naturally-occurring potassium-40, all other gamma-emitting isotopes were below their respective detection limits. There was no indication of a plant effect.

The field sampling personnel conducted an annual land use survey and found no river water taken for irrigation into fields within 5 miles downstream from the Prairie Island Plant. The collection and analysis of corn samples was not required.

Fish

Fish samples were collected in May and September, 2002 and analyzed for gamma emitting isotopes. Only naturally-occurring potassium-40 was detected, and there was no significant difference between upstream and downstream results. There was no indication of a plant effect.

Aquatic Insects or Periphyton

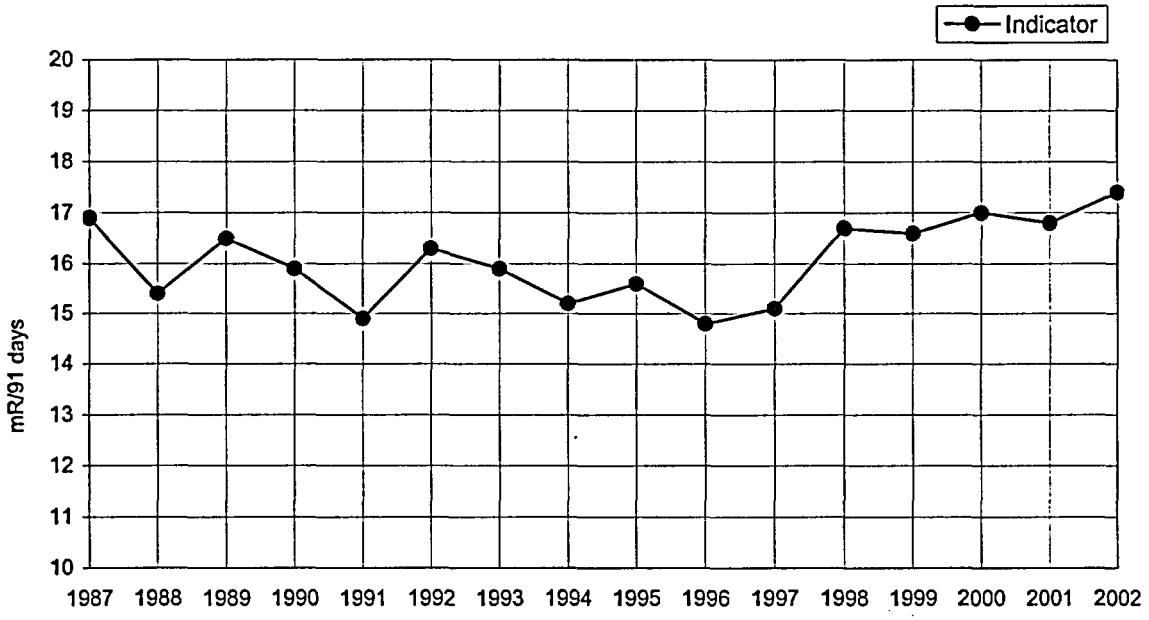
Aquatic insects (invertebrates) or periphyton were collected in May and September, 2002. All gamma-emitting isotopes were below their respective detection limits. There was no indication of any plant effect.

Bottom and Shoreline Sediments

Upstream, downstream and downstream recreational area shoreline sediment collections were made in May and September, 2002 and analyzed for gamma-emitting isotopes. Trace levels of cesium-137 were detected in three of the six samples collected, at both indicator and control locations, averaging 0.050 pCi/g dry weight in two downstream samples and 0.052 pCi/g dry weight in one control sample, indicating the influence of fallout deposition. The only other gamma-emitting isotopes detected were naturally-occurring beryllium-7 and potassium-40. There was no indication of a plant effect.

5.0 FIGURES AND TABLES

Figure 5-1. Offsite Ambient Radiation (TLDs); average of inner and outer ring indicator locations versus control location.



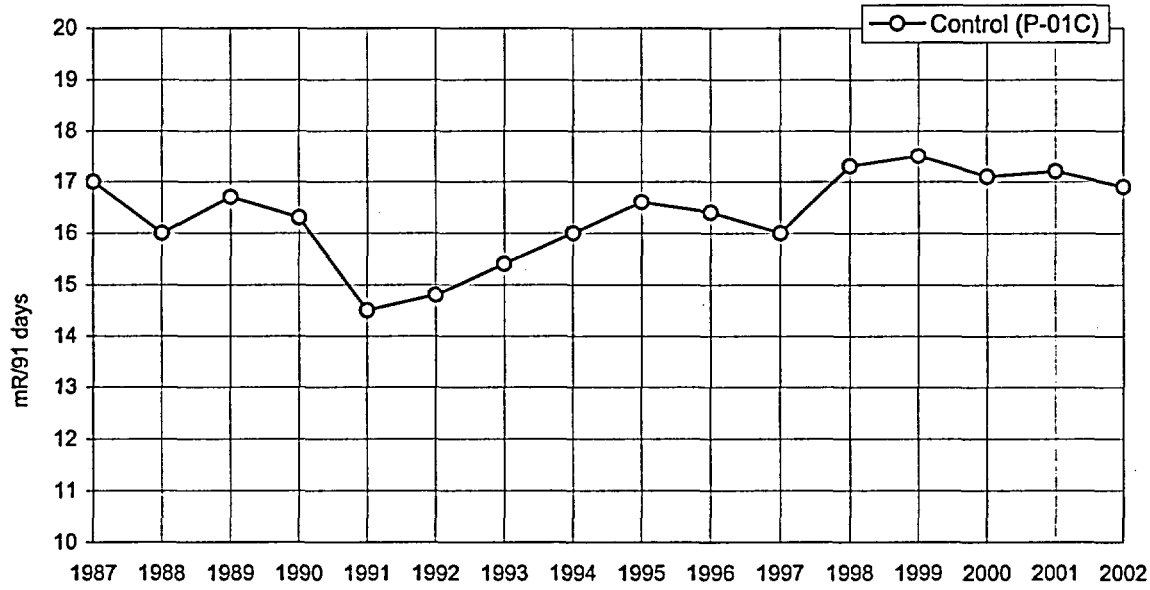
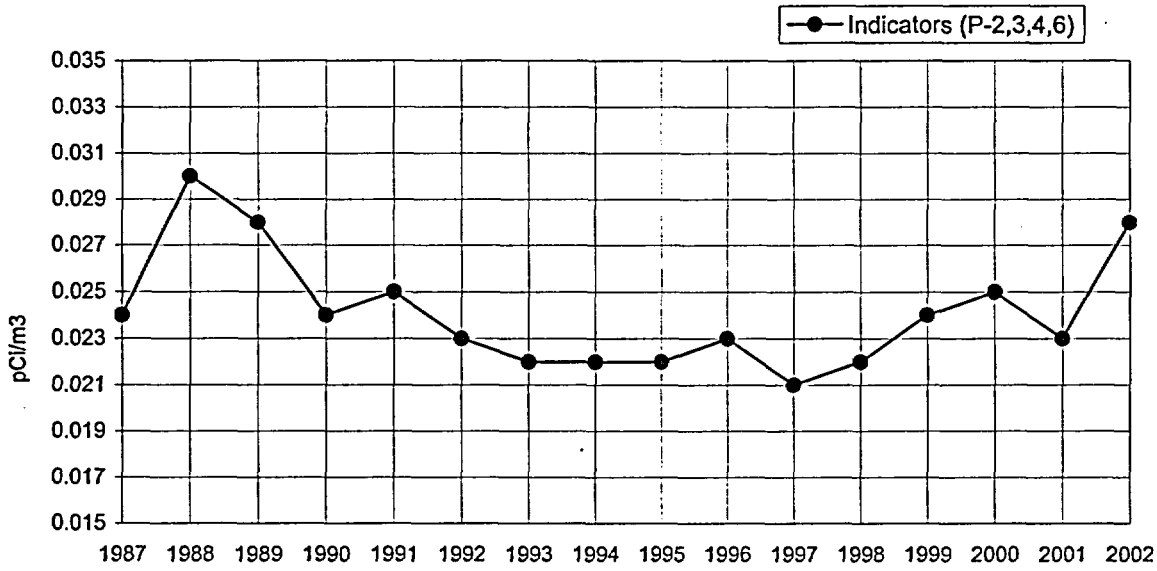


Figure 5-2. Airborne Particulates; analysis for gross beta, average mean of all indicator locations versus control location.



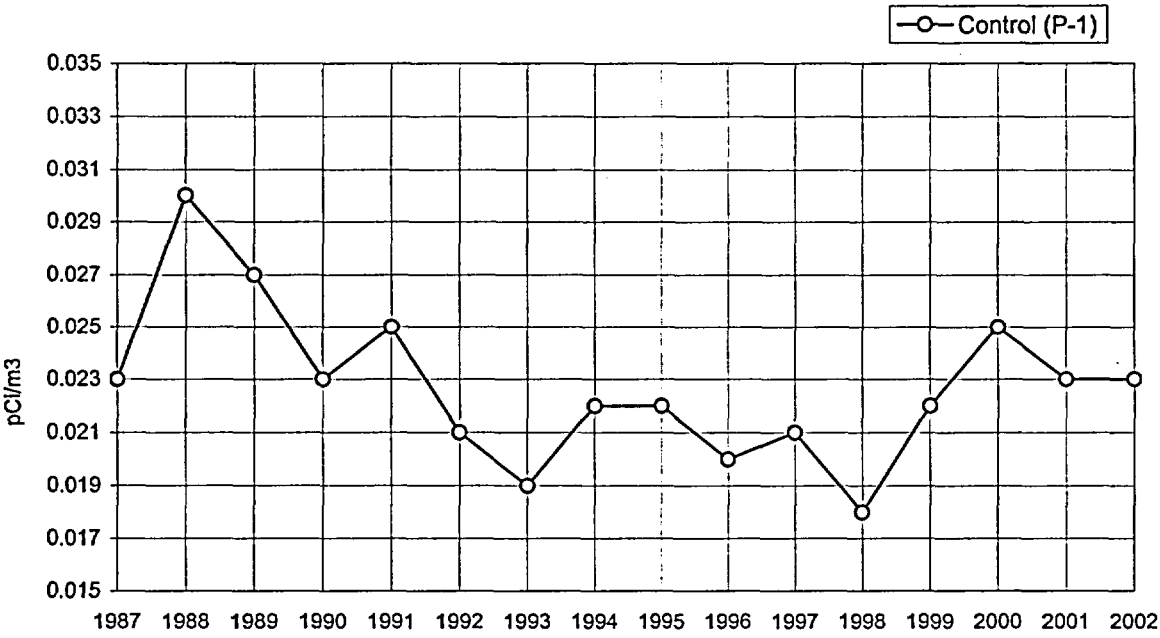


Table 5.1. Sample collection and analysis program, Prairie Island Nuclear Generating Plant.

Medium	Location No.	Location Codes (and Type)[a]	Collection Type and Frequency[b]	Analysis Type and Frequency[c]
Ambient radiation (TLD's)	54	P-01A - P-10A P-01B - P-15B P-01S - P-08S P-01IA - P-08IA P-01IB - P-08IB P-01IX- P-04IX, P-01C	C/Q	Ambient gamma
Airborne Particulates	5	P-1(C), P-2, P-3, P-4, P-6	C/W	GB, GS (QC of each location)
Airborne Iodine	5	P-1(C), P-2, P-3, P-4, P-6	C/W	I-131
Milk	5	P-14, P-18, P-37, P-42 P-41 [C]	G/M[d]	I-131, GS
River water	2	P-5(C), P-6	G/W	GS(MC), H-3(QC)
Drinking water	1	P-11	G/W	GB(MC), I-131(MC) GS (MC), H-3 (QC)
Well water	5	P-6, P-8, P-9, P-24, P-41 (C)	G/Q	H-3, GS
Edible cultivated crops - leafy green vegetables	2	P-38(C), P-24	G/A	GS (I-131)
Fish (one species, edible portion)	2	P-19(C), P-13	G/SA	GS
Periphyton or invertebrates	2	P-40(C), P-6	G/SA	GS
Bottom sediment	2	P-20(C), P-6	G/SA	GS
Shoreline sediment	1	P-12	G/SA	GS

[a] Location codes are defined in Table 5.2. Control stations are indicated by (C). All other stations are indicators.

[b] Collection type is coded as follows: C/ = continuous, G/ = grab. Collection frequency is coded as follows: W= weekly, M = monthly, Q = quarterly, SA = semiannually, A = annually.

[c] Analysis type is coded as follows: GB = gross beta, GS = gamma spectroscopy, H-3 = tritium, I-131 = iodine 131. Analysis frequency is coded as follows: MC = monthly composite, QC = quarterly composite.

[d] Milk is collected biweekly during the grazing season (May - October).

Table 5.2. Sampling locations, Prairie Island Nuclear Generating Plant.

Code	Type[a]	Collection Site	Sample Type[b]	Distance and Direction from Reactor
P-1	C	Air Station P-1	AP, AI	11.8 mi @ 316°/NNW
P-2		Air Station P-2	AP, AI	0.5 mi @ 294°/WNW
P-3		Air Station P-3	AP, AI	0.8 mi @ 313°/NW
P-4		Air Station P-4	AP, AI	0.4 mi @ 359°/N
P-5	C	Upstream of Plant	RW	1.8 mi @ 11°/N
P-6		Lock and Dam #3 & Air Station P-6	AP, AI, RW WW, BS, BO[c]	1.6 mi @ 129°/SE
P-8		Community Center	WW	1.0 mi @ 321°/WNW
P-9		Plant Well #2	WW	0.3 mi @ 306°/NW
P-11		Red Wing Service Center	DW	3.3 mi @ 158°/SSE
P-12		Downstream of Plant	SS	3.0 mi @ 116°/ESE
P-13		Downstream of Plant	F[c]	3.5 mi @ 113°/ESE
P-14		Gustafson Farm	M	2.3 mi @ 173°/S
P-18		Christiansen Farm	M	3.8 mi @ 88°/E
P-19	C	Upstream of Plant	F[c]	1.3 mi @ 0°/N
P-20	C	Upstream of Plant	BS	0.9 mi @ 45°/NE
P-24		Suter Residence	VE, WW	0.6 mi @ 158°/SSE
P-37		Welsch Farm	M	4.1 mi @ 87°/E
P-38	C	Cain Residence	VE	14.2 mi @ 359°/N
P-40	C	Upstream of Plant	BO[c]	0.4 mi @ 0°/N
P-41	C	Huppert Farm	M, WW	13.8 mi @ 354°/N
P-42		Rother Farm	M	4.3 mi. @ 264°/W
General Area of the Site Boundary				
P-01A		Property Line	TLD	0.4 mi @ 359°/N
P-02A		Property Line	TLD	0.3 mi @ 10°/N
P-03A		Property Line	TLD	0.5 mi @ 183°/S
P-04A		Property Line	TLD	0.4 mi @ 204°/SWW
P-05A		Property Line	TLD	0.4 mi @ 225°/SW
P-06A		Property Line	TLD	0.4 mi @ 249°/WSW
P-07A		Property Line	TLD	0.4 mi @ 268°/W
P-08A		Property Line	TLD	0.4 mi @ 291°/WNW
P-09A		Property Line	TLD	0.7 mi @ 317°/NW
P-10A		Property Line	TLD	0.5 mi @ 333°/NNW

Table 5.2. Sampling locations, Prairie Island Nuclear Generating Plant, (continued).

Code	Type[a]	Collection Site	Sample Type[b]	Distance and Direction from Reactor
Approximately 4 to 5 miles Distant from the Plant				
P-01B		Thomas Killian Residence	TLD	4.7 mi @ 355°/N
P-02B		Roy Kinneman Residence	TLD	4.8 mi @ 17°/NNE
P-03B		Wayne Anderson Farm	TLD	4.9 mi @ 46°/NE
P-04B		Nelson Drive (Road)	TLD	4.2 mi @ 61°/ENE
P-05B		County Road E and Coulee	TLD	4.2 mi @ 102°/ESE
P-06B		William Hauschbilt Residence	TLD	4.4 mi @ 112°/ESE
P-07B		Red Wing Public Works	TLD	4.7 mi @ 140°/SE
P-08B		David Wnuk Residence	TLD	4.1 mi @ 165°/SSE
P-09B		Highway 19 South	TLD	4.2 mi @ 187°/S
P-10B		Cannondale Farm	TLD	4.9 mi @ 200°/SSW
P-11B		Wallace Weberg Farm	TLD	4.5 mi @ 221°/SW
P-12B		Ray Gergen Farm	TLD	4.6 mi @ 251°/WSW
P-13B		Thomas O'Rourke Farm	TLD	4.4 mi @ 270°/W
P-14B		David J. Anderson Farm	TLD	4.9 mi @ 306°/NW
P-15B		Holst Farms	TLD	3.8 mi @ 345°/NNW
Special Interest Locations				
P-01S		Federal Lock & Dam #3	TLD	1.6 mi @ 129°/SE
P-02S		Charles Suter Residence	TLD	0.5 mi @ 155°/SSE
P-03S		Carl Gustafson Farm	TLD	2.2 mi @ 173°/S
P-04S		Richard Burt Residence	TLD	2.0 mi @ 202°/SSW
P-05S		Kinney Store	TLD	2.0 mi @ 270°/W
P-06S		Earl Flynn Farm	TLD	2.5 mi @ 299°/WNW
P-07S		Indian Community	TLD	0.7 mi @ 271°/W
P-08S		Indian Community	TLD	0.7 mi @ 287°/NWW
P-01C	C	Robert Kinneman Farm	TLD	11.1 mi @ 331°/NNW

Table 5.2. Sampling locations, Prairie Island Nuclear Generating Plant, (continued).

Code	Type[a]	Collection Site	Type of Sample[b]	Approximate Distance and Direction from ISFSI Center.
ISFSI Area Inside Earth Berm				
P-01IA		ISFSI Nuisance Fence	TLD	190' @ 45°/NE
P-02IA		ISFSI Nuisance Fence	TLD	360' @ 82°/E
P-03IA		ISFSI Nuisance Fence	TLD	370' @ 100°/E
P-04IA		ISFSI Nuisance Fence	TLD	200' @ 134°/SE
P-05IA		ISFSI Nuisance Fence	TLD	180' @ 219°/SW
P-06IA		ISFSI Nuisance Fence	TLD	320' @ 258°/WSW
P-07IA		ISFSI Nuisance Fence	TLD	320' @ 281°/WNW
P-08IA		ISFSI Nuisance Fence	TLD	190' @ 318°/NW
P-01IX		ISFSI Nuisance Fence	TLD	140' @ 180°/S
P-02IX		ISFSI Nuisance Fence	TLD	310' @ 270°/W
P-03IX		ISFSI Nuisance Fence	TLD	140' @ 0°/N
P-04IX		ISFSI Nuisance Fence	TLD	360' @ 90°/E
ISFSI Area Outside Earth Berm				
P-01IB		ISFSI Berm Area	TLD	340' @ 3°/N
P-02IB		ISFSI Berm Area	TLD	380' @ 28°/NNE
P-03IB		ISFSI Berm Area	TLD	560' @ 85°/E
P-04IB		ISFSI Berm Area	TLD	590' @ 165°/SSE
P-05IB		ISFSI Berm Area	TLD	690' @ 186°/S
P-06IB		ISFSI Berm Area	TLD	720' @ 201°/SSW
P-07IB		ISFSI Berm Area	TLD	610' @ 271°/W
P-08IB		ISFSI Berm Area	TLD	360' @ 332°/NNW

[a] "C" denotes control location. All other locations are indicators.

[b] Sample Codes:

AP	Airborne particulates	F	Fish
AI	Airborne Iodine	M	Milk
BS	Bottom (river) sediments	SS	Shoreline Sediments
BO	Bottom organisms (periphyton or macroinvertebrates)	SW	Surface Water
		VE	Vegetation/vegetables
DW	Drinking water	WW	Well water

[c] Distance and direction data for fish and bottom organisms are approximate since availability of sample specimen may vary at any one location.

Table 5.3. Missed collections and analyses at the Prairie Island Nuclear Generating Plant.

All required samples were collected and analyzed as scheduled with the following exceptions:

Sample Type	Analysis	Location	Collection Date or Period	Reason for not conducting REMP as required	Plans for Preventing Recurrence
AP/AI	Beta, I-131	P-04	8/7/2002	Storm related power outage. Partial sample collected.	None required
AP/AI	Beta, I-131	P-02	11/26/2002	No sample; Sampler pump failure.	Sampler pump was replaced.
MI	Gamma, I-131	M-28	10/29/2002 through 12/31/2002	Welsch farm temporarily out of dairy business.	Welsch will inform the PINGP upon resumption of operation in Spring, 2003.

Table 5.4 Radiological Environmental Monitoring Program Summary

Name of Facility: Prairie Island Nuclear Power Station — Docket No.: 50-282, 50-306
Location of Facility: Goodhue, Minnesota (County, State) — Reporting Period: January-December, 2002

Sample Type (Units)	Type and Number of Analyses[a]	LLD[b]	Indicator Locations Mean (F)[c] Range[c]	Location with Highest Annual Mean: Location[d]	Location with Highest Annual Mean: Mean (F)[c] Range[c]	Control Locations Mean (F)[c] Range[c]	Number Non-Routine Results[e]
TLD (Inner Ring, Area at Site Boundary) mR/91 days)	Gamma[f] 40	3.0	16.9 (40/40) (14.4-21.0)	P-06A 0.4 mi @ 249° /WSW	18.1 (4/4) (15.9-21.0)	(See Control below.)	0
TLD (Outer Ring, 4-5 mi. distant) mR/91 days)	Gamma[f] 60	3.0	17.8 (60/60) (13.2-24.0)	P-02B, Roy Kinneman, 4.8 mi @ 17° /NNE	20.3 (4/4) (17.9-24.0)	(See Control below.)	0
TLD (Special Interest Areas) mR/91 days)	Gamma[f] 32	3.0	16.2 (32/32) (12.5-21.6)	P-03S, Gustafson Farm, 2.2 mi @ 173° /S	18.8 (4/4) (16.9-21.6)	(See Control below.)	0
TLD (Control) mR/91 days)	Gamma[f] 4	3.0	None	P-01C, R. Kinneman, 11.1 mi @ 331° /NNW	16.9 (4/4) (15.0-18.9)	16.9 (4/4) (15.0-18.9)	0
Airborne Particulates (pCi/m^3)	GB 259	0.005	0.028 (207/207) (0.011-0.066)	P-06, Air Station 1.6 mi @ 129° /SE	0.029 (52 /52) (0.013-0.062)	0.023 (52/52) (0.013-0.057)	0
	GS 20						
	Be-7	0.015	0.070 (16/16) (0.055-0.088)	P-06, Air Station 1.6 mi @ 129° /SE	0.071 (4/4) (0.059-0.088)	0.057 (4/4) (0.046-0.065)	0
	Mn-54	0.0007	< LLD	-	-	< LLD	0
	Co-58	0.0008	< LLD	-	-	< LLD	0
	Co-60	0.0009	< LLD	-	-	< LLD	0
	Zn-65	0.0009	< LLD	-	-	< LLD	0
	Zr-Nb-95	0.0011	< LLD	-	-	< LLD	0
	Ru-103	0.0010	< LLD	-	-	< LLD	0
	Ru-106	0.0061	< LLD	-	-	< LLD	0
	Cs-134	0.0008	< LLD	-	-	< LLD	0
	Cs-137	0.0006	< LLD	-	-	< LLD	0
	Ba-La-140	0.0029	< LLD	-	-	< LLD	0
	Ce-141	0.0020	< LLD	-	-	< LLD	0
	Ce-144	0.0044	< LLD	-	-	< LLD	0
Airborne Iodine (pCi/m^3)	I-131 259	0.07	< LLD	-	-	< LLD	0

Table 5.4 Radiological Environmental Monitoring Program Summary

Name of Facility: Prairie Island Nuclear Power Station — Docket No.: 50-282, 50-306
Location of Facility: Goodhue, Minnesota (County, State) — Reporting Period: January-December, 2002

Sample Type (Units)	Type and Number of Analyses[a]	LLD[b]	Indicator Locations Mean (F)[c] Range[c]	Location with Highest Annual Mean: Location[d]	Location with Highest Annual Mean: Mean (F)[c] Range[c]	Control Locations Mean (F)[c] Range[c]	Number Non-Routine Results[e]
Milk (pCi/L)	I-131 88	1.0	< LLD	-	-	< LLD	0
	GS 88						
	K-40	200	1427 (70/70) (1207-1603)	P-14, Gustafson Farm 2.3 mi @ 173° /S	1486 (18 /18) (1406-1567)	1415 (18/18) (1316-1589)	0
	Cs-134	15	< LLD	-	-	< LLD	0
	Cs-137	15	< LLD	-	-	< LLD	0
	Ba-La-140	15	< LLD	-	-	< LLD	0
River Water (pCi/L)	H-3 8	164	< LLD	-	-	< LLD	0
	GS 24						
	Mn-54	15	< LLD	-	-	< LLD	0
	Fe-59	30	< LLD	-	-	< LLD	0
	Co-58	15	< LLD	-	-	< LLD	0
	Co-60	15	< LLD	-	-	< LLD	0
	Zn-65	30	< LLD	-	-	< LLD	0
	Zr-Nb-95	15	< LLD	-	-	< LLD	0
	Cs-134	15	< LLD	-	-	< LLD	0
	Cs-137	18	< LLD	-	-	< LLD	0
	Ba-La-140	15	< LLD	-	-	< LLD	0
	Ce-144	49	< LLD	-	-	< LLD	0

Table 5.4 Radiological Environmental Monitoring Program Summary

Name of Facility: Prairie Island Nuclear Power Station — Docket No.: 50-282, 50-306
Location of Facility: Goodhue, Minnesota (County, State) — Reporting Period: January-December, 2002

Sample Type (Units)	Type and Number of Analyses[a]	LLD[b]	Indicator Locations Mean (F)[c] Range[c]	Location with Highest Annual Mean		Control Locations Mean (F)[c] Range[c]	Number Non-Routine Results[e]
				Location[d]	Mean (F)[c] Range[c]		
Drinking Water (pCi/L)	GB 12	1.0	8.7 (12/12) (5.8-10.8)	P-11, Red Wing S.C. 3.3 mi @ 158° /SSE	8.7 (12/12) (5.8-10.8)	None	0
	I-131 12	1.0	< LLD		-	None	0
	H-3 4	164	< LLD	-	-	None	0
	GS 12						
	Mn-54	15	< LLD	-	-	None	0
	Fe-59	30	< LLD	-	-	None	0
	Co-58	15	< LLD	-	-	None	0
	Co-60	15	< LLD	-	-	None	0
	Zn-65	30	< LLD	-	-	None	0
	Zr-Nb-95	15	< LLD	-	-	None	0
	Cs-134	10	< LLD	-	-	None	0
	Cs-137	18	< LLD	-	-	None	0
	Ba-La-140	15	< LLD	-	-	None	0
	Ce-144	51	< LLD	-	-	None	0
Well Water (pCi/L)	H-3 20	156	219 (1/16)	P-24, Suter Residence 0.6 mi @ 158°/SSE	219 (1/4)	< LLD	0
	GS 20						
	Mn-54	15	< LLD	-	-	< LLD	0
	Fe-59	30	< LLD	-	-	< LLD	0
	Co-58	15	< LLD	-	-	< LLD	0
	Co-60	15	< LLD	-	-	< LLD	0
	Zn-65	30	< LLD	-	-	< LLD	0
	Zr-Nb-95	15	< LLD	-	-	< LLD	0
	Cs-134	10	< LLD	-	-	< LLD	0
	Cs-137	18	< LLD	-	-	< LLD	0
	Ba-La-140	15	< LLD	-	-	< LLD	0
	Ce-144	52	< LLD	-	-	< LLD	0
Crops - Cabbage (pCi/gwet)	I-131 2	0.008	< LLD	-	-	< LLD	0

Table 5.4 Radiological Environmental Monitoring Program Summary

Name of Facility: Prairie Island Nuclear Power Station — Docket No.: 50-282, 50-306
Location of Facility: Goodhue, Minnesota (County, State) — Reporting Period: January-December, 2002

Sample Type (Units)	Type and Number of Analyses[a]	LLD[b]	Indicator Locations Mean (F)[c] Range[c]	Location with Highest Annual Mean: Location[d]	Location with Highest Annual Mean: Mean (F)[c] Range[c]	Control Locations Mean (F)[c] Range[c]	Number Non-Routine Results[e]
Fish	GS 4						
(pCi/g wet)	K-40	0.10	2.67 (2/2) (2.53-2.81)	P-19, Upstream 1.3 mi. @ 0° /N	3.00 (2/2) (2.87-3.13)	3.00 (2/2) (2.87-3.13)	0
	Mn-54	0.015	< LLD	-	-	< LLD	0
	Fe-59	0.040	< LLD	-	-	< LLD	0
	Co-58	0.018	< LLD	-	-	< LLD	0
	Co-60	0.016	< LLD	-	-	< LLD	0
	Zn-65	0.037	< LLD	-	-	< LLD	0
	Zr-Nb-95	0.025	< LLD	-	-	< LLD	0
	Cs-134	0.016	< LLD	-	-	< LLD	0
	Cs-137	0.017	< LLD	-	-	< LLD	0
	Ba-La-140	0.042	< LLD	-	-	< LLD	0
Invertebrates	GS 4						
(pCi/g wet)	Be-7	0.63	< LLD	-	-	< LLD	0
	K-40	1.63	< LLD	-	-	< LLD	0
	Mn-54	0.072	< LLD	-	-	< LLD	0
	Co-58	0.057	< LLD	-	-	< LLD	0
	Co-60	0.052	< LLD	-	-	< LLD	0
	Zn-65	0.14	< LLD	-	-	< LLD	0
	Zr-Nb-95	0.11	< LLD	-	-	< LLD	0
	Ru-103	0.080	< LLD	-	-	< LLD	0
	Ru-106	0.49	< LLD	-	-	< LLD	0
	Cs-134	0.091	< LLD	-	-	< LLD	0
	Cs-137	0.063	< LLD	-	-	< LLD	0
	Ba-La-140	0.26	< LLD	-	-	< LLD	0
	Ce-141	0.16	< LLD	-	-	< LLD	0
	Ce-144	0.50	< LLD	-	-	< LLD	0

Table 5.4 Radiological Environmental Monitoring Program Summary

Name of Facility: Prairie Island Nuclear Power Station — Docket No.: 50-282, 50-306
Location of Facility: Goodhue, Minnesota (County, State) — Reporting Period: January-December, 2002

Sample Type (Units)	Type and Number of Analyses[a]	LLD[b]	Indicator Locations Mean (F)[c] Range[c]	Location with Highest Annual Mean: Location[d]	Location with Highest Annual Mean: Mean (F)[c] Range[c]	Control Locations Mean (F)[c] Range[c]	Number Non-Routine Results[e]
Bottom and Shoreline Sediments (pCi/g dry)	GS 6						
	Be-7	0.25	1.05 (1/4)	P-6, Lock and Dam #3 1.6 mi @ 129°/SE	1.05 (1/2)	0.56 (1/2)	0
	K-40	0.10	7.63 (4/4) (6.02-8.80)	P-20, Upstream 0.9 mi. @ 45° /NE	9.43 (2/2) (8.03-10.83)	9.43 (2/2) (8.03-10.83)	0
	Mn-54	0.019	< LLD	-	-	< LLD	0
	Co-58	0.025	< LLD	-	-	< LLD	0
	Co-60	0.021	< LLD	-	-	< LLD	0
	Zn-65	0.061	< LLD	-	-	< LLD	0
	Zr-Nb-95	0.043	< LLD	-	-	< LLD	0
	Ru-103	0.036	< LLD	-	-	< LLD	0
	Ru-106	0.17	< LLD	-	-	< LLD	0
	Cs-134	0.025	< LLD	-	-	< LLD	0
	Cs-137	0.017	0.050 (2/4) (0.046-0.053)	P-6, Lock and Dam #3 1.6 mi @ 129°/SE	0.053 (1/2)	0.052 (1/2)	0
	Ba-La-140	0.16	< LLD	-	-	< LLD	0
	Ce-141	0.068	< LLD	-	-	< LLD	0
	Ce-144	0.10	< LLD	-	-	< LLD	0

[a] GB = gross beta, GS = gamma scan.
[b] LLD = nominal lower limit of detection based on a 4.66 sigma counting error for background sample.
[c] Mean and range are based on detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parentheses (F).
[d] Locations are specified: (1) by name, and/or station code (Table 2) and (2) by distance (miles) and direction relative to reactor site.
[e] Non-routine results are those which exceed ten times the control station value. If no control station value is available, the result is considered non-routine if it exceeds ten time the typical preoperational value for the medium or location.

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APPENDIX A

INTERLABORATORY COMPARISON PROGRAM RESULTS

NOTE: Environmental Inc., Midwest Laboratory participates in intercomparison studies administered by Environmental Resources Associates, and serves as a replacement for studies conducted previously by the U.S. EPA Environmental Monitoring Systems Laboratory, Las Vegas, Nevada. Results are reported in Appendix A. TLD Intercomparison results, in-house spikes, blanks, duplicates and mixed analyte performance evaluation program results are also reported. Appendix A is updated four times a year; the complete Appendix is included in March, June, September and December monthly progress reports only.

January, 2002 through December, 2002

Appendix A

Interlaboratory Comparison Program Results

Environmental, Inc., Midwest Laboratory, formerly Teledyne Brown Engineering Environmental Services Midwest Laboratory has participated in interlaboratory comparison (crosscheck) programs since the formulation of it's quality control program in December 1971. These programs are operated by agencies which supply environmental type samples containing concentrations of radionuclides known to the issuing agency but not to participant laboratories. The purpose of such a program is to provide an independent check on a laboratory's analytical procedures and to alert it of any possible problems.

Participant laboratories measure the concentration of specified radionuclides and report them to the issuing agency. Several months later, the agency reports the known values to the participant laboratories and specifies control limits. Results consistently higher or lower than the known values or outside the control limits indicate a need to check the instruments or procedures used.

Results in Table A-1 were obtained through participation in the environmental sample crosscheck program administered by Environmental Resources Associates, serving as a replacement for studies conducted previously by the U.S. EPA Environmental Monitoring Systems Laboratory, Las Vegas, Nevada.

The results in Table A-2 were obtained for Thermoluminescent Dosimeters (TLDs), via International Intercomparison of Environmental Dosimeters under the sponsorships listed in Table A-2. Results of internal laboratory testing is also listed.

Table A-3 lists results of the analyses on in-house "spiked" samples for the past twelve months. All samples are prepared using NIST traceable sources. Data for previous years available upon request.

Table A-4 lists results of the analyses on in-house "blank" samples for the past twelve months. Data for previous years available upon request. request.

Table A-5 list results of the in-house "duplicate" program for the past twelve months. Acceptance is based on the difference of the results being less than the sum of the errors. Data for previous years available upon request.

The results in Table A-6 were obtained through participation in the Mixed Analyte Performance Evaluation Program.

The results in Table A-7 were obtained through participation in the Environmental Measurement Laboratory Quality Assessment Program.

Attachment A lists acceptance criteria for "spiked" samples.

Out-of-limit results are explained directly below the result.

Attachment A

ACCEPTANCE CRITERIA FOR "SPIKED" SAMPLES

LABORATORY PRECISION: ONE STANDARD DEVIATION VALUES FOR VARIOUS ANALYSES[a]

Analysis	Level	One standard deviation for single determination
Gamma Emitters	5 to 100 pCi/liter or kg > 100 pCi/liter or kg	5.0 pCi/liter 5% of known value
Strontium-89[b]	5 to 50 pCi/liter or kg > 50 pCi/liter or kg	5.0 pCi/liter 10% of known value
Strontium-90[b]	2 to 30 pCi/liter or kg > 30 pCi/liter or kg	5.0 pCi/liter 10% of known value
Potassium-40	> 0.1 g/liter or kg	5% of known value
Gross alpha	20 pCi/liter > 20 pCi/liter	5.0 pCi/liter 25% of known value
Gross beta	100 pCi/liter > 100 pCi/liter	5.0 pCi/liter 5% of known value
Tritium	4,000 pCi/liter > 4,000 pCi/liter	1s = (pCi/liter) = $169.85 \times (\text{known})^{0.0933}$ 10% of known value
Radium-226,-228	0.1 pCi/liter	15% of known value
Plutonium	0.1 pCi/liter, gram, or sample	10% of known value
Iodine-131, Iodine-129[b]	55 pCi/liter > 55 pCi/liter	6.0 pCi/liter 10% of known value
Uranium-238, Nickel-63[b] Technetium-99[b]	35 pCi/liter > 35 pCi/liter	6.0 pCi/liter 15% of known value
Iron-55[b]	50 to 100 pCi/liter > 100 pCi/liter	10 pCi/liter 10% of known value
Others[b]	---	20% of known value

[a] From EPA publication, "Environmental Radioactivity Laboratory Intercomparison Studies Program, Fiscal Year, 1981-1982, EPA-600/4-81-004.

[b] Laboratory limit.

TABLE A-1. Interlaboratory Comparison Crosscheck program, Environmental Resource Associates (ERA)[a].

Lab Code	Date	Analysis	Concentration (pCi/L) Laboratory Result[b]	ERA Result[c]	Control Limits
STW-940	02/20/02	Sr-89	53.0 ± 2.5	55.3 ± 5.0	46.6 - 64.0
STW-940	02/20/02	Sr-90	16.6 ± 0.5	15.9 ± 5.0	7.2 - 24.6
STW-942	02/20/02	Gr. Alpha	6.5 ± 0.6	8.0 ± 5.0	0.0 - 16.7
STW-942	02/20/02	Gr. Beta	45.7 ± 3.1	48.3 ± 5.0	39.6 - 57.0
STW-944	02/20/02	Ba-133	25.8 ± 1.5	28.9 ± 5.0	20.2 - 37.6
STW-944	02/20/02	Co-60	76.9 ± 2.7	73.4 ± 5.0	64.7 - 82.1
STW-944	02/20/02	Cs-134	38.7 ± 1.6	42.1 ± 5.0	33.4 - 50.8
STW-944	02/20/02	Cs-137	92.9 ± 2.7	88.8 ± 5.0	80.1 - 97.5
STW-944	02/20/02	Ra-226	15.3 ± 0.7	14.3 ± 2.2	10.6 - 18.0
STW-944	02/20/02	Ra-228	17.5 ± 0.4	16.9 ± 4.2	9.6 - 24.2
STW-944	02/20/02	Uranium	23.8 ± 1.1	28.3 ± 3.0	23.1 - 33.5
STW-944	02/20/02	Zn-65	361.0 ± 9.2	359.0 ± 35.9	298.0 - 420.0
STW-951	05/22/02	Gr. Alpha	23.9 ± 2.5	22.8 ± 5.7	13.0 - 32.6
STW-951	05/22/02	Ra-226	5.9 ± 0.5	6.1 ± 0.9	4.5 - 7.7
STW-951	05/22/02	Ra-228	5.6 ± 0.9	4.5 ± 1.1	2.6 - 6.5
STW-951	05/22/02	Uranium	7.6 ± 0.2	9.3 ± 3.0	4.1 - 14.5
STW-952	05/22/02	Co-60	37.9 ± 0.7	39.1 ± 5.0	30.4 - 47.8
STW-952	05/22/02	Cs-134	14.5 ± 0.8	17.1 ± 5.0	8.4 - 25.8
STW-952	05/22/02	Cs-137	50.0 ± 2.0	52.1 ± 5.0	43.4 - 60.8
STW-952	05/22/02	Gr. Beta	171.0 ± 2.5	189.0 ± 28.4	140.0 - 238.0
STW-952	05/22/02	Sr-89	28.4 ± 4.8	31.7 ± 5.0	23.0 - 40.4
STW-952	05/22/02	Sr-90	32.4 ± 3.1	28.3 ± 5.0	19.6 - 37.0
STW-953[d]	05/22/02	H-3	13900.0 ± 100.0	17400.0 ± 1740.0	14400.0 - 20400.0
STW-954	05/22/02	I-131	14.6 ± 0.3	14.7 ± 2.0	11.2 - 18.2
STW-965	08/21/02	Ba-133	71.9 ± 2.1	80.0 ± 8.0	66.4 - 93.6
STW-965	08/21/02	Co-60	23.8 ± 1.0	23.3 ± 5.0	14.6 - 32.0
STW-965	08/21/02	Cs-134[e]	62.9 ± 1.2	71.7 ± 5.0	63.0 - 80.4
STW-965	08/21/02	Cs-137	219.3 ± 10.7	214.0 ± 10.7	195.0 - 233.0
STW-965	08/21/02	Gr. Alpha	74.4 ± 0.6	58.8 ± 14.7	33.5 - 84.1
STW-965	08/21/02	Gr. Beta	26.7 ± 0.4	21.9 ± 2.2	13.2 - 30.6
STW-965	08/21/02	Ra-226	5.0 ± 0.5	5.0 ± 0.8	3.7 - 6.3
STW-965	08/21/02	Ra-228	6.0 ± 0.7	4.7 ± 1.2	2.7 - 6.7
STW-965	08/21/02	Sr-89	28.4 ± 1.5	29.0 ± 5.0	20.3 - 37.7
STW-965	08/21/02	Sr-90	36.5 ± 1.1	36.4 ± 5.0	27.7 - 45.1
STW-965	08/21/02	Uranium	4.1 ± 0.1	5.0 ± 3.0	0.0 - 10.2
STW-965	08/21/02	Zn-65	92.4 ± 2.2	95.7 ± 9.6	79.4 - 112.0
STW-966	11/20/02	Gr. Alpha	9.3 ± 0.4	12.2 ± 5.0	3.5 - 20.9
STW-966	11/20/02	Gr. Beta	44.7 ± 1.0	47.0 ± 5.0	38.3 - 55.7
STW-967	11/20/02	H-3	10100.0 ± 38.7	10200.0 ± 1020.0	8440.0 - 12000.0
STW-968	11/20/02	Ra-226	11.6 ± 0.1	12.1 ± 1.8	9.0 - 15.2
STW-968	11/20/02	Ra-228	16.0 ± 1.4	15.1 ± 3.8	8.6 - 21.6
STW-968	11/20/02	Uranium	15.5 ± 0.5	19.2 ± 3.0	14.0 - 24.4
STW-969	11/20/02	I-131	6.0 ± 0.4	6.8 ± 2.0	3.3 - 10.2

TABLE A-1. Interlaboratory Comparison Crosscheck program, Environmental Resource Associates (ERA)[a].

Lab Code	Date	Analysis	Concentration (pCi/L) Laboratory Result[b]	ERA Result[c]	Control Limits
STW-970	11/20/02	Co-60	104.0 ± 7.1	104.0 ± 5.2	95.0 - 113.0
STW-970	11/20/02	Cs-134	48.2 ± 2.3	55.5 ± 5.0	46.8 - 64.2
STW-970	11/20/02	Cs-137	109.0 ± 12.6	117.0 ± 5.9	107.0 - 127.0
STW-970	11/20/02	Gr. Beta	252.0 ± 26.8	288.0 ± 49.5	244.0 - 416.0
STW-970	11/20/02	Sr-89	43.2 ± 0.7	47.6 ± 5.0	38.9 - 56.3
STW-970	11/20/02	Sr-90	7.5 ± 0.2	7.6 ± 5.0	0.0 - 16.2
STW-971	11/20/02	Gr. Alpha	74.9 ± 1.5	103.0 ± 25.8	58.4 - 148.0
STW-971	11/20/02	Ra-226	8.9 ± 0.0	9.1 ± 1.4	6.7 - 11.5
STW-971	11/20/02	Ra-228	15.3 ± 0.1	17.8 ± 4.5	10.1 - 25.5
STW-971	11/20/02	Uranium	51.7 ± 1.6	61.7 ± 6.2	51.0 - 72.4

[a] Results obtained by Environmental, Inc., Midwest Laboratory as a participant in the environmental samples crosscheck program operated by Environmental Resources Associates (ERA).

[b] Unless otherwise indicated, the laboratory result is given as the mean ± standard deviation for three determinations.

[c] Results are presented as the known values, expected laboratory precision (1 sigma, 1 determination) and control limits as provided by ERA.

[d] Analysis was repeated; result of reanalysis: 16114±487 pCi/L.

[e] ERA acknowledged an unacceptably high percentage of failure for Cs-134 and questioned its own control limits. No problems were identified in the analysis.

TABLE A-2. Crosscheck program results; Thermoluminescent Dosimetry, (TLDs).

Lab Code	TLD Type	Date	Measurement	mR Known Value	mR Lab Result ± 2 sigma	mR Control Limits
Environmental, Inc.						
2001-1	CaSO4: Dy Cards	12/24/2001	Reader 1, #1	3.98	3.71 ± 0.12	2.79 - 5.17
2001-1	CaSO4: Dy Cards	12/24/2001	Reader 1, #1	3.98	3.38 ± 0.09	2.79 - 5.17
2001-1	CaSO4: Dy Cards	12/24/2001	Reader 1, #2	7.07	7.89 ± 0.18	4.95 - 9.19
2001-1	CaSO4: Dy Cards	12/24/2001	Reader 1, #2	7.07	7.64 ± 0.25	4.95 - 9.19
2001-1	CaSO4: Dy Cards	12/24/2001	Reader 1, #3	15.9	18.62 ± 0.40	11.13 - 20.67
2001-1	CaSO4: Dy Cards	12/24/2001	Reader 1, #3	15.9	19.58 ± 0.12	11.13 - 20.67
2001-1	CaSO4: Dy Cards	12/24/2001	Reader 1, #4	63.61	78.24 ± 1.23	44.53 - 82.69
2001-1	CaSO4: Dy Cards	12/24/2001	Reader 1, #4	63.61	79.89 ± 2.47	44.53 - 82.69
Environmental, Inc.						
2002-1	CaSO4: Dy Cards	5/28/2002	Reader 1, #1	4.84	4.44 ± 0.16	3.39 - 6.29
2002-1	CaSO4: Dy Cards	5/28/2002	Reader 1, #1	4.84	4.37 ± 0.20	3.39 - 6.29
2002-1	CaSO4: Dy Cards	5/28/2002	Reader 1, #2	8.60	9.08 ± 0.14	6.02 - 11.18
2002-1	CaSO4: Dy Cards	5/28/2002	Reader 1, #2	8.60	8.76 ± 0.16	6.02 - 11.18
2002-1	CaSO4: Dy Cards	5/28/2002	Reader 1, #3	19.34	22.14 ± 0.27	13.54 - 25.14
2002-1	CaSO4: Dy Cards	5/28/2002	Reader 1, #3	19.34	24.03 ± 0.30	13.54 - 25.14
2002-1	CaSO4: Dy Cards	5/28/2002	Reader 1, #4	77.36	92.77 ± 0.58	54.15 - 100.57
2002-1	CaSO4: Dy Cards	5/28/2002	Reader 1, #4	77.36	85.25 ± 0.37	54.15 - 100.57
Environmental, Inc.						
2002-2	CaSO4: Dy Cards	12/13/2002	Reader 1, 30	56.73	71.61 ± 1.79	39.71 - 73.75
2002-2	CaSO4: Dy Cards	12/13/2002	Reader 1, 45[a]	25.21	33.49 ± 1.38	17.65 - 32.77
[a] Precision of the distance (cm) measurement can significantly increase the error. The placement of the card holder on the table could account for the higher error.						
2002-2	CaSO4: Dy Cards	12/13/2002	Reader 1, 60	14.18	17.37 ± 1.24	9.93 - 18.43
2002-2	CaSO4: Dy Cards	12/13/2002	Reader 1, 75	9.08	10.65 ± 1.02	6.36 - 11.80
2002-2	CaSO4: Dy Cards	12/13/2002	Reader 1, 90	6.30	6.37 ± 0.54	4.41 - 8.19
2002-2	CaSO4: Dy Cards	12/13/2002	Reader 1, 120	3.55	4.60 ± 0.41	2.49 - 4.62
2002-2	CaSO4: Dy Cards	12/13/2002	Reader 1, 135	2.80	2.51 ± 0.23	1.96 - 3.64
2002-2	CaSO4: Dy Cards	12/13/2002	Reader 1, 150	2.28	2.22 ± 0.28	1.60 - 2.96

TABLE A-3. In-House "Spike" Samples

Lab Code	Sample Type	Date	Analysis	Concentration (pCi/L)[a] Laboratory results 2s, n=1[b]	Known Activity	Control Limits[c]
SPW-11552	Water	1/7/2002	Gr. Alpha	35.33 ± 1.83	34.57	17.29 - 51.86
SPW-11552	Water	1/7/2002	Gr. Beta	112.62 ± 2.44	107.70	96.93 - 118.47
SPMI-595	Milk	1/31/2002	Cs-134	29.63 ± 4.98	27.10	17.10 - 37.10
SPMI-595	Milk	1/31/2002	Cs-137	51.31 ± 7.55	50.89	40.89 - 60.89
SPMI-597	Milk	1/31/2002	Co-60	44.18 ± 7.76	41.36	31.36 - 51.36
SPMI-597	Milk	1/31/2002	Cs-134	20.15 ± 5.08	22.59	12.59 - 32.59
SPMI-597	Milk	1/31/2002	Cs-137	54.88 ± 8.32	50.89	40.89 - 60.89
SPAP-594	Air Filter	2/6/2002	Gr. Beta	1.58 ± 0.02	1.55	0.00 - 11.55
SPW-599	Water	2/19/2002	H-3	47607 ± 595	50189	40151 ± 60227
SPMI-1446	Milk	3/8/2002	I-131(G)	87.84 ± 11.47	85.20	75.20 - 95.20
SPW-1446	Water	3/8/2002	I-131	82.98 ± 1.20	85.20	68.16 - 102.24
SPW-1446	Water	3/8/2002	I-131(G)	92.75 ± 12.87	85.20	75.20 - 95.20
SPMI-1448	Milk	3/8/2002	I-131	88.00 ± 1.13	85.20	68.16 - 102.24
SPVE-1444	Vegetation	3/11/2002	I-131(G)	0.39 ± 0.04	0.42	0.25 - 0.58
SPAP-2078	Air Filter	4/8/2002	Gr. Beta	1.43 ± 0.01	1.55	0.00 - 11.55
SPW-2080	Water	4/5/2002	H-3	49121 ± 608	46912	37530 ± 56294
SPF-2082	Fish	4/5/2002	Cs-134	0.83 ± 0.04	0.83	0.50 - 1.16
SPF-2082	Fish	4/5/2002	Cs-137	1.29 ± 0.07	1.35	0.81 - 1.89
SPMI-2084	Milk	4/8/2002	Cs-134	20.93 ± 5.82	24.69	14.69 - 34.69
SPMI-2084	Milk	4/8/2002	Cs-137	51.83 ± 10.23	50.56	40.56 - 60.56
SPMI-2084	Milk	4/8/2002	I-131	87.72 ± 1.28	88.37	70.70 - 106.04
SPMI-2084	Milk	4/8/2002	I-131(G)	84.08 ± 10.75	88.37	78.37 - 98.37
SPMI-2084	Milk	4/8/2002	Sr-90	62.81 ± 1.99	66.85	53.48 - 80.22
SPW-2115	Water	4/8/2002	I-131	82.42 ± 1.27	88.37	70.70 - 106.04
SPW-2116	Water	4/8/2002	Co-60	32.47 ± 5.78	33.09	23.09 - 43.09
SPW-2116	Water	4/8/2002	Cs-134	30.80 ± 3.60	28.80	18.80 - 38.80
SPW-2116	Water	4/8/2002	Cs-137	53.85 ± 7.07	50.56	40.56 - 60.56
SPW-2116	Water	4/8/2002	I-131(G)	79.09 ± 7.58	88.37	78.37 - 98.37
SPW-2116	Water	4/8/2002	Sr-90	70.35 ± 2.32	66.85	53.48 - 80.22
SPW-2019	Water	5/3/2002	Gr. Alpha	25.89 ± 1.71	34.57	17.29 - 51.86
SPW-2019	Water	5/3/2002	Gr. Beta	101.19 ± 2.37	107.70	96.93 - 118.47
SPCH-3064	Charcoal	5/11/2002	I-131(G)	0.74 ± 0.04	0.85	0.51 - 1.18
SPW-4682	Water	7/17/2002	H-3	40856 ± 548	46179	36943 ± 55415
SPAP-4685	Air Filter	7/17/2002	Gr. Beta	1.58 ± 0.02	1.55	0.00 - 11.55
W-71702S	Water	7/17/2002	Fe-55	10463.00 ± 126.00	12200.60	9760.48 - 14640.72
W-71702S	Water	07/17/02	H-3	45779 ± 583	46179	36943 ± 55415
W-71702S	Water	07/17/02	Ni-63	17.02 ± 1.50	17.10	10.26 - 23.94
SPVE-4910	Vegetation	07/22/02	Sr-90	10.22 ± 0.80	9.04	0.00 - 19.04
W-72302S	Water	07/23/02	Sr-90	21.43 ± 0.97	26.55	16.55 - 36.55
W-80102S	Water	08/01/02	Gr. Alpha	41.25 ± 4.58	34.45	17.23 - 51.68
W-80102S	Water	08/01/02	Gr. Beta	113.66 ± 5.30	107.70	96.93 - 118.47
W-80202S	Water	08/02/02	Tc-99	16.39 ± 0.72	14.13	2.13 - 26.13
SPW-7188	Water	10/25/02	Fe-55	20396 ± 265	22778	18222 - 27334
SPW-7190	Water	10/25/02	Ni-63	227.18 ± 11.60	170.80	102.48 - 239.12

TABLE A-3. In-House "Spike" Samples

Lab Code	Sample Type	Date	Analysis	Concentration (pCi/L) Laboratory results 2s, n=1[b]	Known Activity	Control Limits[c]
SPW-7192	Water	10/25/02	H-3	96310 ± 871	90963	72770 - 109156
SPW-7194	Water	10/25/02	C-14	42938 ± 167	49661	29796 - 69525
SPAP-7198	Air Filter	10/25/02	Gr. Beta	1.65 ± 0.02	1.53	0.00 - 11.53
SPW-7335	Water	10/30/02	Co-60	39.67 ± 7.38	37.05	27.05 - 47.05
SPW-7335	Water	10/30/02	Cs-134	33.09 ± 5.96	34.11	24.11 - 44.11
SPW-7335	Water	10/30/02	Cs-137	46.80 ± 10.39	49.90	39.90 - 59.90
SPMI-7336	Milk	10/30/02	Cs-134	34.40 ± 4.99	34.11	24.11 - 44.11
SPMI-7336	Milk	10/30/02	Cs-137	46.52 ± 8.52	49.91	39.91 - 59.91
SPF-7340	Fish	10/30/02	Cs-134	0.66 ± 0.03	0.68	0.41 - 0.95
SPF-7340	Fish	10/30/02	Cs-137	1.35 ± 0.05	1.33	0.80 - 1.86
SPS-8102	Sediment	11/01/02	Sr-90	14.69 ± 0.67	13.45	3.45 - 23.45

[a] Results are reported in units of pCi/L, except for air filters (pCi/Filter), food products, vegetation, soil, sediment (pCi/g).
[b] Results are based on single determinations.
[c] Control limits are based on Attachment A, Page A2 of this report.

NOTE: For fish, Jello is used for the Spike matrix. For Vegetation, cabbage is used for the Spike matrix.

TABLE A-4. In-House "Blank" Samples

Lab Code	Sample Type	Date	Analysis	Concentration (pCi/L)[a]		
				Laboratory results (4.66σ)		Acceptance
				LLD	Activity[b]	Criteria (4.66 σ)
SPW-11551	water	1/7/2002	Gr. Alpha	0.47	0.45 ± 0.39	1
SPW-11551	water	1/7/2002	Gr. Beta	1.37	0.55 ± 1.03	3.2
SPAP-590	Air Filter	1/31/2002	Co-60	1.78		100
SPAP-590	Air Filter	1/31/2002	Cs-134	3.42		100
SPAP-590	Air Filter	1/31/2002	Cs-137	2.33		100
SPAP-590	Air Filter	1/31/2002	Gr. Beta	0.74	-0.096 ± 0.38	3.2
SPMI-596	Milk	1/31/2002	Co-60	3.54		10
SPMI-596	Milk	1/31/2002	Cs-134	3.24		10
SPMI-596	Milk	1/31/2002	Cs-137	3.89		10
SPMI-596	Milk	1/31/2002	K-40		1472.1 ± 101.50	0
SPW-598	water	1/31/2002	Co-60	2.30		10
SPW-598	water	1/31/2002	Cs-134	3.74		10
SPW-598	water	1/31/2002	Cs-137	3.23		10
SPW-600	water	1/31/2002	H-3	138.80	-96.5 ± 63.40	200
SPMI-1447	Milk	3/7/2002	I-131(G)	7.63		20
SPVE-1443	Vegetation	3/8/2002	I-131(G)	0.02		20
SPW-1445	water	3/8/2002	Co-60	2.76		10
SPW-1445	water	3/8/2002	Cs-134	2.87		10
SPW-1445	water	3/8/2002	Cs-137	4.34		10
SPW-1445	water	3/8/2002	I-131	0.45	0.17 ± 0.31	0.5
SPW-1445	water	3/8/2002	I-131(G)	6.50		20
SPMI-1447	Milk	3/8/2002	I-131	0.31	0.15 ± 0.22	0.5
SPAP-2077	Air Filter	4/8/2002	Gr. Beta	0.32	-0.055 ± 0.19	3.2
SPW-2079	water	4/5/2002	H-3	134.17	16.13 ± 67.39	200
SPF-2081	Fish	4/5/2002	Cs-134	7.67		100
SPF-2081	Fish	4/5/2002	Cs-137	9.54		100
SPMI-2083	Milk	4/8/2002	Cs-134	2.90		10
SPMI-2083	Milk	4/8/2002	Cs-137	3.03		10
SPMI-2083	Milk	4/8/2002	I-131	0.52	-0.38 ± 0.34	0.5
SPMI-2083	Milk[c]	4/8/2002	Sr-90	0.48	1.29 ± 0.36	1
SPW-2115	water	4/8/2002	Co-60	1.49		10
SPW-2115	water	4/8/2002	Cs-134	2.09		10
SPW-2115	water	4/8/2002	Cs-137	3.78		10
SPW-2115	water	4/8/2002	I-131	0.50	-0.16 ± 0.33	0.5
SPW-2115	water	4/8/2002	I-131(G)	3.30		20
SPW-2115	water	4/8/2002	Sr-90	0.66	0.10 ± 0.32	1
SPW-2018	water	4/22/2002	Gr. Alpha	0.56	-0.24 ± 0.38	1
SPW-2018	water	4/22/2002	Gr. Beta	1.38	3.19 ± 1.03	3.2
SPch-3063	Charcoal	5/11/2002	I-131(G)	8.27		9.6
SPW-4683	water	7/17/2002	H-3	129.00	-62.8 ± 60.30	200
W-71702	water	7/17/2002	Fe-55	33.61	-1.72 ± 15.63	1000
W-71702	water	7/17/2002	Ni-63	2.56	0.71 ± 1.37	20
W-71802B	water	7/18/2002	Gr. Alpha	0.48	0.31 ± 0.36	1
W-71802B	water	7/18/2002	Gr. Beta	1.33	0.9 ± 0.95	3.2

TABLE A-4. In-House "Blank" Samples

Lab Code	Sample Type	Date	Analysis	Concentration (pCi/L)[a]		
				Laboratory results (4.66σ)		Acceptance
				LLD	Activity[b]	Criteria (4.66 σ)
W-72302	water	7/23/2002	Sr-90	0.27	0.027 ± 0.13	1
W-80202	water	8/2/2002	Tc-99	0.34	-0.051 ± 0.16	10
SPW-7189	water	10/25/2002	Fe-55	978.21	21.77 ± 595.33	1000
SPW-7191	water	10/25/2002	Ni-63	11.74	4.47 ± 7.24	20
SPW-7193	water	10/25/2002	H-3	146.00	-92 ± 65.00	200
SPAP-7199	Air Filter	10/25/2002	Gr. Beta	0.00	-0.0024 ± 0.00	3.2
SPMI-7333	Milk	10/30/2002	Cs-134	5.30		10
SPMI-7333	Milk	10/30/2002	Cs-137	4.80		10
SPW-7334	water	10/30/2002	Co-60	3.69		10
SPW-7334	water	10/30/2002	Cs-134	5.37		10
SPW-7334	water	10/30/2002	Cs-137	3.90		10
SPF-7339	Fish	10/30/2002	Cs-134	4.69		100
SPF-7339	Fish	10/30/2002	Cs-137	11.18		100

[a] Liquid sample results are reported in pCi/Liter, air filters(pCi/filter), charcoal (pCi/charcoal canister), and solid samples (pCi/kg).

[b] The activity reported is the net activity result.

[c] Low levels of Sr-90 are still detected in the environment. A concentration of (1-5 pCi/L) in milk is not unusual.

TABLE A-5. In-House "Duplicate" Samples

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result
CF-20, 21	1/2/2002	Be-7	0.47 ± 0.25	0.37 ± 0.12	0.42 ± 0.14
CF-20, 21	1/2/2002	Gr. Beta	7.82 ± 0.20	7.95 ± 0.21	7.89 ± 0.14
CF-20, 21	1/2/2002	K-40	6.65 ± 0.55	6.53 ± 0.36	6.59 ± 0.33
CF-20, 21	1/2/2002	Sr-90	0.01 ± 0.01	0.01 ± 0.01	0.01 ± 0.00
AP-11804, 11805	1/2/2002	Be-7	0.054 ± 0.011	0.049 ± 0.019	0.052 ± 0.011
AP-11825, 11826	1/2/2002	Be-7	0.053 ± 0.013	0.043 ± 0.013	0.048 ± 0.009
AP-11846, 11847	1/2/2002	Be-7	0.054 ± 0.018	0.048 ± 0.016	0.051 ± 0.012
WW-150, 151	1/7/2002	Gr. Beta	1.26 ± 0.50	1.04 ± 0.46	1.15 ± 0.34
MI-124, 125	1/8/2002	K-40	1332.30 ± 158.90	1271.70 ± 151.50	1302.00 ± 109.77
W-172, 173	1/8/2002	H-3	153.00 ± 68.00	148.00 ± 68.00	150.50 ± 48.08
SW-11698, 11699	1/8/2002	Gr. Alpha	2.51 ± 1.36	3.71 ± 1.80	3.11 ± 1.13
SW-11698, 11699	1/8/2002	Gr. Beta	7.68 ± 1.33	8.49 ± 1.43	8.09 ± 0.98
U-275, 276	1/10/2002	Gr. Alpha	1.40 ± 1.00	1.10 ± 1.20	1.25 ± 0.78
LW-356, 357	1/16/2002	Gr. Beta	3.47 ± 0.65	2.94 ± 0.61	3.21 ± 0.45
LW-377, 378	1/16/2002	Gr. Beta	2.75 ± 0.68	2.84 ± 0.61	2.79 ± 0.46
SW-525, 526	1/30/2002	Gr. Alpha	0.56 ± 0.35	0.24 ± 0.35	0.40 ± 0.25
SW-525, 526	1/30/2002	Gr. Beta	2.29 ± 0.41	2.58 ± 0.39	2.43 ± 0.28
DW-504, 505	1/31/2002	Gr. Alpha	2.30 ± 1.70	3.90 ± 1.40	3.10 ± 1.10
MI-649, 650	2/5/2002	K-40	1319.40 ± 176.70	1210.80 ± 118.20	1265.10 ± 106.29
DW-697, 698	2/6/2002	Gr. Beta	5.10 ± 1.20	4.70 ± 1.20	4.90 ± 0.85
DW-927, 928	2/8/2002	Sr-90	0.69 ± 0.29	0.71 ± 0.29	0.70 ± 0.21
W-973, 974	2/18/2002	Fe-55	7.29 ± 0.97	6.86 ± 0.94	7.08 ± 0.68
W-1673, 1674	2/25/2002	H-3	2640.00 ± 155.00	2908.00 ± 161.00	2774.00 ± 111.74
SWT-1395, 1396	2/26/2002	Gr. Beta	2.96 ± 0.59	2.29 ± 0.53	2.63 ± 0.40
MI-1268, 1269	2/27/2002	K-40	1460.50 ± 162.50	1573.00 ± 168.00	1516.75 ± 116.87
MI-1268, 1269	2/27/2002	Sr-90	0.77 ± 0.36	0.95 ± 0.40	0.86 ± 0.27
MI-1332, 1333	3/5/2002	K-40	1503.00 ± 164.00	1305.00 ± 168.00	1404.00 ± 117.39
MI-1332, 1333	3/5/2002	Sr-90	1.35 ± 0.38	1.07 ± 0.40	1.21 ± 0.28
MI-1458, 1459	3/6/2002	K-40	1411.70 ± 166.70	1390.00 ± 172.30	1400.85 ± 119.87
DW-10100, 10101	3/9/2002	Gr. Alpha	4.10 ± 1.70	1.80 ± 1.60	2.95 ± 1.17
DW-10111, 10112	3/9/2002	Gr. Alpha	7.10 ± 2.00	8.30 ± 2.30	7.70 ± 1.52
MI-1521, 1522	3/11/2002	K-40	1270.80 ± 103.30	1369.10 ± 121.60	1319.95 ± 79.78
MI-1521, 1522	3/11/2002	Sr-90	1.69 ± 0.46	2.46 ± 0.49	2.07 ± 0.34
MI-1541, 1542	3/11/2002	K-40	1562.20 ± 122.80	1529.30 ± 126.10	1545.75 ± 88.01
MI-1541, 1542	3/11/2002	Sr-90	0.85 ± 0.57	1.48 ± 0.43	1.16 ± 0.36
LW-1651, 1652	3/14/2002	Gr. Beta	2.90 ± 0.57	2.57 ± 0.56	2.74 ± 0.40
DW-10134, 10135	3/16/2002	Gr. Alpha	5.60 ± 1.90	5.40 ± 1.60	5.50 ± 1.24
WW-1694, 1695	3/18/2002	Gr. Beta	1.79 ± 0.59	1.53 ± 0.50	1.66 ± 0.39
SO-1715, 1716	3/19/2002	Cs-137	0.03 ± 0.01	0.02 ± 0.01	0.03 ± 0.01
SO-1715, 1716	3/19/2002	Gr. Beta	18.50 ± 1.70	19.10 ± 1.70	18.80 ± 1.20
DW-10302, 10303	3/20/2002	Gr. Alpha	2.30 ± 1.40	3.30 ± 1.60	2.80 ± 1.06
W-1758, 1759	3/25/2002	Gr. Alpha	2.50 ± 0.70	2.30 ± 0.60	2.40 ± 0.46
W-1758, 1759	3/25/2002	Gr. Beta	4.10 ± 1.20	2.50 ± 1.10	3.30 ± 0.81

TABLE A-5. In-House "Duplicate" Samples

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result
MI-1926, 1927	3/26/2002	K-40	1414.00 ± 115.00	1316.00 ± 128.00	1365.00 ± 86.04
MI-1926, 1927	3/26/2002	Sr-90	2.30 ± 0.70	2.40 ± 0.70	2.35 ± 0.49
SWU-2010, 2011	3/26/2002	Gr. Beta	2.90 ± 0.60	2.20 ± 0.50	2.55 ± 0.39
DW-10376, 10377	3/27/2002	Gr. Beta	10.50 ± 1.30	10.10 ± 1.50	10.30 ± 0.99
AP-2479, 2480	3/28/2002	Be-7	0.064 ± 0.023	0.068 ± 0.014	0.066 ± 0.013
DW-10395, 10396	3/29/2002	Gr. Alpha	10.20 ± 2.10	14.60 ± 2.40	12.40 ± 1.59
LW-2181, 2182	3/31/2002	Gr. Beta	2.98 ± 0.68	1.99 ± 0.70	2.48 ± 0.49
LW-2181, 2182	3/31/2002	H-3	2694.43 ± 156.53	2688.84 ± 156.40	2691.64 ± 110.64
CW-2437, 2438	3/31/2002	Gr. Beta	1.09 ± 0.61	1.14 ± 0.58	1.11 ± 0.42
CW-2437, 2438	3/31/2002	H-3	6456.70 ± 229.20	6292.80 ± 226.52	6374.75 ± 161.12
MI-1947, 1948	4/1/2002	K-40	1421.40 ± 130.90	1256.80 ± 104.20	1339.10 ± 83.65
AP-2458, 2459	4/1/2002	Be-7	0.077 ± 0.011	0.081 ± 0.010	0.079 ± 0.008
DW-10409, 10410	4/1/2002	Gr. Alpha	39.30 ± 4.00	35.30 ± 3.60	37.30 ± 2.69
MI-2052, 2053	4/3/2002	K-40	1283.70 ± 103.20	1434.80 ± 147.90	1359.25 ± 90.17
MI-2052, 2053	4/3/2002	Sr-90	0.81 ± 0.36	0.75 ± 0.35	0.78 ± 0.25
AP-2711, 2712	4/3/2002	Be-7	0.071 ± 0.01	0.07 ± 0.01	0.07 ± 0.01
W-938, 939	4/9/2002	Ni-63	1.73 ± 0.10	1.82 ± 0.10	1.78 ± 0.07
SS-2202, 2203	4/9/2002	Gr. Beta	5.83 ± 1.16	5.52 ± 1.19	5.67 ± 0.83
SS-2202, 2203	4/9/2002	K-40	5.75 ± 0.48	6.11 ± 0.51	5.93 ± 0.35
F-2307, 2308	4/10/2002	K-40	2.75 ± 0.27	2.49 ± 0.32	2.62 ± 0.21
DW-10476, 10477	4/12/2002	Gr. Alpha	5.10 ± 1.30	3.90 ± 1.60	4.50 ± 1.03
W-2244, 2245	4/15/2002	Gr. Beta	1.70 ± 1.10	1.60 ± 1.00	1.65 ± 0.74
DW-10509, 10510	4/17/2002	Gr. Alpha	6.00 ± 2.00	7.30 ± 1.80	6.65 ± 1.35
SW-2690, 2691	4/24/2002	Gr. Beta	2.25 ± 0.68	2.15 ± 0.59	2.20 ± 0.45
SO-2903, 2904	4/24/2002	Be-7	1.22 ± 0.57	0.78 ± 0.43	1.00 ± 0.36
SO-2903, 2904	4/24/2002	Cs-137	0.13 ± 0.05	0.09 ± 0.05	0.11 ± 0.04
SO-2903, 2904	4/24/2002	K-40	21.06 ± 1.48	19.91 ± 1.16	20.48 ± 0.94
DW-10562, 10563	4/24/2002	Gr. Alpha	2.17 ± 1.13	3.25 ± 1.54	2.71 ± 0.96
DW-10578, 10579	4/29/2002	Gr. Alpha	8.20 ± 2.20	7.40 ± 2.00	7.80 ± 1.49
SO-2861, 2862	4/30/2002	Cs-137	236.40 ± 46.00	200.70 ± 52.60	218.55 ± 34.94
SO-2861, 2862	4/30/2002	K-40	10191.00 ± 784.60	11025.00 ± 941.30	10608.00 ± 612.71
SL-2819, 2820	5/1/2002	Be-7	805.70 ± 301.50	860.73 ± 164.80	833.22 ± 171.80
SL-2819, 2820	5/1/2002	Gr. Beta	5566.00 ± 124.00	5359.00 ± 122.00	5462.50 ± 86.98
SL-2819, 2820	5/1/2002	K-40	5524.00 ± 632.90	5277.50 ± 431.40	5400.75 ± 382.97
SL-2840, 2841	5/1/2002	Be-7	1010.00 ± 352.10	872.95 ± 181.70	941.48 ± 198.11
SL-2840, 2841	5/1/2002	Gr. Beta	4399.00 ± 221.80	4593.00 ± 276.00	4496.00 ± 177.04
SL-2840, 2841	5/1/2002	K-40	2422.80 ± 352.10	2254.10 ± 371.40	2338.45 ± 255.89
MI-2971, 2972	5/5/2002	K-40	1338.90 ± 83.44	1345.80 ± 100.90	1342.35 ± 65.47
MI-2971, 2972	5/5/2002	Sr-90	0.83 ± 0.47	1.65 ± 0.46	1.24 ± 0.33
DW-10603, 10604	5/6/2002	Gr. Alpha	6.30 ± 1.70	5.50 ± 1.60	5.90 ± 1.17
SS-3037, 3038	5/9/2002	K-40	11585.00 ± 749.00	11612.00 ± 787.00	11598.50 ± 543.22
MI-3124, 3125	5/13/2002	K-40	1329.50 ± 103.80	1373.00 ± 107.40	1351.25 ± 74.68
MI-3208, 3209	5/14/2002	K-40	1494.60 ± 158.40	1462.60 ± 182.50	1478.60 ± 120.83
LW-3250, 3251	5/15/2002	Gr. Beta	3.14 ± 0.55	3.28 ± 0.63	3.21 ± 0.42

TABLE A-5. In-House "Duplicate" Samples

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result
CF-3292, 3293	5/20/2002	K-40	1.33 ± 0.99	1.14 ± 0.91	1.23 ± 0.67
MI-3376, 3377	5/26/2002	K-40	1333.30 ± 159.40	1090.70 ± 143.40	1212.00 ± 107.21
MI-3418, 3419	5/28/2002	K-40	1423.70 ± 121.30	1443.30 ± 164.30	1433.50 ± 102.11
SWT-3461, 3462	5/28/2002	Gr. Beta	2.65 ± 0.54	3.28 ± 0.60	2.97 ± 0.40
SO-3503, 3504	5/29/2002	Cs-137	0.17 ± 0.04	0.18 ± 0.05	0.18 ± 0.03
SO-3503, 3504	5/29/2002	Gr. Beta	27.72 ± 2.26	25.45 ± 2.03	26.58 ± 1.52
SO-3503, 3504	5/29/2002	K-40	20.24 ± 1.19	20.54 ± 1.24	20.39 ± 0.86
SL-3545, 3546	6/3/2002	Gr. Beta	4436.00 ± 90.00	4281.00 ± 89.00	4358.50 ± 63.29
SL-3545, 3546	6/3/2002	K-40	4684.20 ± 734.40	5242.50 ± 884.50	4963.35 ± 574.82
DW-10754, 10755	6/6/2002	Sr-90	0.50 ± 0.30	0.60 ± 0.30	0.55 ± 0.21
SW-3777, 3778	6/11/2002	Gr. Alpha	4.42 ± 1.50	2.97 ± 1.40	3.70 ± 1.02
SW-3777, 3778	6/11/2002	Gr. Beta	7.57 ± 1.22	6.83 ± 1.16	7.20 ± 0.84
MI-3798, 3799	6/11/2002	K-40	1433.40 ± 124.20	1401.20 ± 96.96	1417.30 ± 78.78
LW-3924, 3925	6/13/2002	Gr. Beta	3.05 ± 0.59	3.38 ± 0.72	3.21 ± 0.46
MI-3966, 3967	6/18/2002	K-40	1245.20 ± 109.20	1340.20 ± 121.90	1292.70 ± 81.83
MI-3966, 3967	6/18/2002	Sr-90	2.38 ± 0.51	2.63 ± 0.52	2.51 ± 0.36
MI-3987, 3988	6/19/2002	Sr-90	0.98 ± 0.35	0.97 ± 0.35	0.98 ± 0.25
MI-4095, 4096	6/25/2002	K-40	1256.10 ± 138.20	1199.00 ± 128.30	1227.55 ± 94.29
SWU-4221, 4222	6/25/2002	Gr. Beta	6.89 ± 1.97	5.38 ± 1.93	6.13 ± 1.38
LW-4179, 4180	6/27/2002	Gr. Beta	2.37 ± 0.58	2.00 ± 0.62	2.19 ± 0.42
G-4329, 4330	7/1/2002	Be-7	1394.80 ± 538.40	1098.10 ± 437.40	1246.45 ± 346.84
G-4329, 4330	7/1/2002	Gr. Beta	8.10 ± 0.27	8.00 ± 0.25	8.05 ± 0.18
G-4329, 4330	7/1/2002	K-40	7758.20 ± 1100.00	8399.80 ± 929.30	8079.00 ± 720.00
SL-4337, 4338	7/1/2002	Be-7	1480.90 ± 223.80	1726.40 ± 552.60	1603.65 ± 298.10
SL-4337, 4338	7/1/2002	Cs-137	32.30 ± 14.70	50.97 ± 27.10	41.64 ± 15.42
SL-4337, 4338	7/1/2002	Gr. Beta	5262.40 ± 522.10	5432.40 ± 540.00	5347.40 ± 375.56
SL-4337, 4338	7/1/2002	K-40	2249.00 ± 381.90	2989.90 ± 509.60	2619.45 ± 318.41
AP-4864, 4865	7/1/2002	Be-7	0.085 ± 0.009	0.085 ± 0.006	0.085 ± 0.006
MI-4359, 4360	7/2/2002	K-40	1390.10 ± 168.30	1567.40 ± 194.30	1478.75 ± 128.53
AP-4569, 4570	7/2/2002	Be-7	0.068 ± 0.016	0.086 ± 0.018	0.077 ± 0.012
AP-4843, 4844	7/2/2002	Be-7	0.077 ± 0.016	0.090 ± 0.020	0.084 ± 0.013
AP-4789, 4790	7/3/2002	Be-7	0.080 ± 0.013	0.078 ± 0.015	0.079 ± 0.010
SWU-4810, 4811	7/3/2002	Gr. Beta	2.40 ± 0.84	2.47 ± 0.88	2.43 ± 0.61
MI-4548, 4549	7/9/2002	K-40	1511.80 ± 127.00	1446.80 ± 101.80	1479.30 ± 81.38
DW-4737, 4738	7/12/2002	I-131	0.52 ± 0.20	0.49 ± 0.29	0.51 ± 0.18
MI-4632, 4633	7/15/2002	K-40	1198.40 ± 114.10	1371.30 ± 146.90	1284.85 ± 93.00
MI-5054, 5055	7/30/2002	K-40	1428.80 ± 105.60	1344.30 ± 106.40	1386.55 ± 74.95
G-5075, 5076	7/30/2002	Gr. Beta	7.11 ± 0.07	6.99 ± 0.07	7.05 ± 0.05
SWU-5124, 5125	7/30/2002	Gr. Beta	1.75 ± 0.84	1.90 ± 0.78	1.82 ± 0.57
G-5151, 5152	7/31/2002	Be-7	1.82 ± 0.30	2.05 ± 0.32	1.93 ± 0.22
G-5151, 5152	7/31/2002	K-40	5.13 ± 0.66	5.72 ± 0.70	5.42 ± 0.48
MI-5103, 5104	8/2/2002	K-40	1415.90 ± 70.57	1423.80 ± 129.20	1419.85 ± 73.61
LW-5434, 5435	8/5/2002	Gr. Beta	2.77 ± 0.35	2.26 ± 0.35	2.52 ± 0.25
MI-5215, 5216	8/7/2002	K-40	1361.10 ± 111.90	1358.30 ± 115.80	1359.70 ± 80.52

TABLE A-5. In-House "Duplicate" Samples

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result
MI-5355, 5356	8/13/2002	K-40	1405.00 ± 165.80	1549.30 ± 114.40	1477.15 ± 100.72
F-5413, 5414	8/15/2002	Gr. Beta	2.37 ± 0.10	2.55 ± 0.10	2.46 ± 0.07
F-5413, 5414	8/15/2002	K-40	1.47 ± 0.32	1.73 ± 0.43	1.60 ± 0.27
MI-5603, 5604	8/26/2002	I-131	0.64 ± 0.34	0.52 ± 0.36	0.58 ± 0.25
MI-5603, 5604	8/26/2002	K-40	1353.60 ± 83.13	1261.40 ± 117.80	1307.50 ± 72.09
MI-5578, 5579	8/27/2002	K-40	1301.50 ± 161.70	1381.60 ± 111.20	1341.55 ± 98.12
VE-5682, 5683	8/28/2002	Be-7	0.29 ± 0.10	0.25 ± 0.11	0.27 ± 0.08
VE-5682, 5683	8/28/2002	Gr. Beta	3.79 ± 0.08	3.80 ± 0.08	3.79 ± 0.06
VE-5682, 5683	8/28/2002	K-40	3.06 ± 0.29	3.31 ± 0.42	3.18 ± 0.25
WW-6188, 6189	8/31/2002	Gr. Beta	2.70 ± 0.57	2.30 ± 0.57	2.50 ± 0.41
SL-5724, 5725	9/3/2002	Be-7	0.92 ± 0.19	1.04 ± 0.23	0.98 ± 0.15
SL-5724, 5725	9/3/2002	Cs-137	0.05 ± 0.02	0.05 ± 0.02	0.05 ± 0.01
SL-5724, 5725	9/3/2002	K-40	2.09 ± 0.31	2.28 ± 0.48	2.19 ± 0.29
MI-5877, 5878	9/9/2002	K-40	1340.70 ± 165.00	1168.50 ± 172.50	1254.60 ± 119.35
MI-6157, 6158	9/19/2002	K-40	1372.10 ± 115.10	1136.50 ± 222.70	1254.30 ± 125.34
MI-6258, 6259	9/24/2002	K-40	1328.60 ± 201.00	1312.60 ± 118.60	1320.60 ± 116.69
LW-6278, 6279	9/30/2002	Gr. Beta	2.15 ± 0.51	1.70 ± 0.50	1.93 ± 0.36
MI-6385, 6386	10/1/2002	K-40	1297.10 ± 168.90	1310.10 ± 128.30	1303.60 ± 106.05
BS-6453, 6454	10/1/2002	Cs-137	0.43 ± 0.03	0.44 ± 0.03	0.44 ± 0.02
BS-6453, 6454	10/1/2002	K-40	16.50 ± 0.51	16.80 ± 0.61	16.65 ± 0.40
SO-6478, 6479	10/1/2002	Cs-137	0.074 ± 0.016	0.070 ± 0.016	0.072 ± 0.011
SO-6478, 6479	10/1/2002	Gr. Alpha	8.01 ± 4.36	7.55 ± 4.57	7.78 ± 3.16
SO-6478, 6479	10/1/2002	Gr. Beta	30.41 ± 4.07	33.04 ± 4.28	31.73 ± 2.95
SO-6478, 6479	10/1/2002	K-40	19.82 ± 0.53	20.39 ± 0.58	20.10 ± 0.39
SO-6478, 6479	10/1/2002	Sr-90	0.087 ± 0.017	0.094 ± 0.020	0.091 ± 0.013
AP-6641, 6642	10/1/2002	Be-7	0.070 ± 0.016	0.080 ± 0.015	0.075 ± 0.011
MI-6544, 6545	10/2/2002	K-40	1331.60 ± 125.20	1326.50 ± 171.60	1329.05 ± 106.21
AP-6857, 6858	10/3/2002	Be-7	0.062 ± 0.015	0.071 ± 0.015	0.066 ± 0.010
AP-6857, 6858	10/3/2002	Be-7	0.062 ± 0.015	0.071 ± 0.015	0.066 ± 0.010
AP-6857, 6858	10/3/2002	Be-7	0.062 ± 0.015	0.071 ± 0.015	0.066 ± 0.010
BS-6620, 6621	10/7/2002	Co-60	0.090 ± 0.020	0.11 ± 0.02	0.10 ± 0.01
BS-6620, 6621	10/7/2002	Cs-137	0.62 ± 0.04	0.63 ± 0.03	0.62 ± 0.02
BS-6620, 6621	10/7/2002	K-40	11.38 ± 0.48	10.78 ± 0.52	11.08 ± 0.35
MI-6651, 6652	10/8/2002	K-40	1565.50 ± 141.00	1640.60 ± 189.20	1603.05 ± 117.98
G-6760, 6761	10/9/2002	Be-7	2.17 ± 0.49	2.31 ± 0.34	2.24 ± 0.30
G-6760, 6761	10/9/2002	K-40	6.24 ± 1.00	6.61 ± 0.60	6.42 ± 0.58
SWU-7054, 7055	10/10/2002	Gr. Beta	3.09 ± 0.57	2.06 ± 0.52	2.57 ± 0.39
U-7126, 7127	10/11/2002	Gr. Beta	2.61 ± 1.24	2.61 ± 1.08	2.61 ± 0.82
XW-7768, 7769	10/14/2002	Cs-137	2.25 ± 0.25	2.09 ± 0.18	2.17 ± 0.15
XW-7768, 7769	10/14/2002	H-3	2.63 ± 0.10	2.64 ± 0.10	2.64 ± 0.07
F-7148, 7149	10/15/2002	K-40	2.57 ± 0.28	2.98 ± 0.44	2.77 ± 0.26
BS-7337, 7338	10/23/2002	Co-60	0.083 ± 0.025	0.073 ± 0.031	0.078 ± 0.020
BS-7337, 7338	10/23/2002	Cs-137	0.082 ± 0.019	0.11 ± 0.04	0.10 ± 0.02
BS-7337, 7338	10/23/2002	Gr. Beta	12.54 ± 2.34	12.99 ± 2.22	12.77 ± 1.61
SO-7407, 7408	10/29/2002	Cs-137	0.14 ± 0.03	0.15 ± 0.03	0.15 ± 0.02
SO-7407, 7408	10/29/2002	Gr. Beta	16.73 ± 2.21	16.62 ± 2.27	16.67 ± 1.58
SO-7407, 7408	10/29/2002	K-40	12.05 ± 0.61	12.27 ± 0.81	12.16 ± 0.51

TABLE A-5. In-House "Duplicate" Samples

			Concentration (pCi/L)[a]		
Lab Code	Date	Analysis	First Result	Second Result	Averaged Result
MI-7428, 7429	10/29/2002	K-40	1542.60 ± 213.00	1355.80 ± 185.70	1449.20 ± 141.29
pw-7621, 7622	10/30/2002	Gr. Beta	2.22 ± 0.92	2.08 ± 0.83	2.15 ± 0.62
TD-7653, 7654	10/31/2002	H-3	11122.00 ± 387.00	11259.00 ± 390.00	11190.50 ± 274.71
SW-7569, 7570	11/5/2002	Gr. Beta	15.90 ± 1.25	16.24 ± 1.27	16.07 ± 0.89
SW-7569, 7570	11/5/2002	K-40	14.79 ± 1.48	14.79 ± 1.48	14.79 ± 1.05
SO-8010, 8011	11/7/2002	Cs-137	0.11 ± 0.02	0.11 ± 0.03	0.11 ± 0.02
SO-8010, 8011	11/7/2002	K-40	6.91 ± 0.54	7.21 ± 0.54	7.06 ± 0.38
VE-7747, 7748	11/11/2002	Gr. Beta	3.59 ± 0.05	3.25 ± 0.05	3.42 ± 0.03
VE-7747, 7748	11/11/2002	K-40	3.17 ± 0.36	3.26 ± 0.46	3.22 ± 0.29
MI-7789, 7790	11/13/2002	K-40	1319.30 ± 167.60	1301.20 ± 140.70	1310.25 ± 109.41
DW-8082, 8083	11/29/2002	I-131	0.83 ± 0.24	0.98 ± 0.22	0.90 ± 0.16
SW-8054, 8055	12/2/2002	Gr. Beta	2.60 ± 0.46	2.21 ± 0.39	2.41 ± 0.30
SW-8054, 8055	12/2/2002	K-40	1.44 ± 0.14	1.43 ± 0.14	1.44 ± 0.10
MI-8105, 8106	12/4/2002	K-40	1300.60 ± 111.30	1315.40 ± 108.90	1308.00 ± 77.86
TD-8298, 8299	12/5/2002	H-3	355.00 ± 94.00	469.00 ± 99.00	412.00 ± 68.26
MI-8396, 8397	12/17/2002	K-40	1409.20 ± 117.30	1449.60 ± 108.60	1429.40 ± 79.93
SWT-8654, 8655	12/30/2002	Gr. Beta	1.63 ± 0.50	1.40 ± 0.47.	1.51 ± 0.34
AP-8783, 8784	12/31/2002	Be-7	0.044 ± 0.009	0.042 ± 0.008	0.043 ± 0.006

Note: Duplicate analyses are performed on every twentieth sample received in-house. Results are not listed for those analyses with activities that measure below the LLD.

[a] Results are reported in units of pCi/L, except for air filters (pCi/Filter), food products, vegetation, soil, sediment (pCi/g).

TABLE A-6. Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP)[a].

			Concentration[b]			
Lab Code	Type	Date	Analysis	Laboratory result	Known Activity	Control Limits[c]
STW-939	water	12/01/01	Am-241	1.25 ± 0.0	1.19 ± 0.0	0.83 - 1.6
STW-939	water	12/01/01	Co-57	138.9 ± 0.5	143 ± 14.3	100.1 - 185.9
STW-939	water	12/01/01	Co-60	139.1 ± 0.5	141 ± 14.1	98.7 - 183.3
STW-939	water	12/01/01	Cs-134	25.16 ± 0.2	28.5 ± 0.3	19.95 - 37.1
STW-939	water	12/01/01	Cs-137	279.96 ± 0.9	286 ± 28.6	200.2 - 371.8
STW-939[d]	water	12/01/01	Fe-55	19.68 ± 23.2	9.2 ± 0.9	6.44 - 12.0
STW-939	water	12/01/01	Mn-54	253.64 ± 0.9	246 ± 0.2	172.2 - 319.8
STW-939	water	12/01/01	Ni-63	65.88 ± 1.9	88.3 ± 8.8	61.81 - 114.8
STW-939[e]	water	12/01/01	Pu-238	0.060 ± 0.01	0.0 ± 0.0	-
STW-939	water	12/01/01	Pu-239/40	2.79 ± 0.0	2.99 ± 0.3	2.09 - 3.9
STW-939	water	12/01/01	Sr-90	4.88 ± 0.3	4.8 ± 0.5	3.36 - 6.2
STW-939	water	12/01/01	U-233/4	0.89 ± 0.0	0.98 ± 0.1	0.69 - 1.3
STW-939	water	12/01/01	U-238	6.75 ± 0.0	7.8 ± 0.8	5.46 - 10.1
STW-939	water	12/01/01	Zn-65	70.6 ± 1.1	67.3 ± 6.7	47.11 - 87.5
STSO-955	soil	10/16/02	Am-241	40.54 ± 2.7	43.5 ± 4.4	30.45 - 56.6
STSO-955	soil	10/16/02	Co-57	210.58 ± 2.0	246 ± 24.6	172.2 - 319.8
STSO-955	soil	10/16/02	Co-60	84.38 ± 0.9	87.5 ± 8.8	61.25 - 113.8
STSO-955	soil	10/16/02	Cs-134	692.6 ± 2.1	862 ± 86.0	603.4 - 1120.6
STSO-955	soil	10/16/02	Cs-137	96.98 ± 1.7	111 ± 11.1	77.7 - 144.3
STSO-955	soil	10/16/02	Fe-55	1714.6 ± 299.6	1870 ± 187.0	1309 - 2431.0
STSO-955	soil	10/16/02	Mn-54	509.74 ± 3.4	546 ± 54.6	382.2 - 709.8
STSO-955	soil	10/16/02	Ni-63	890.6 ± 22.4	1180 ± 118.0	826 - 1534.0
STSO-955	soil	10/16/02	Pu-238	34.04 ± 6.0	33.3 ± 3.3	23.31 - 43.3
STSO-955	soil	10/16/02	Pu-239/40	68.7 ± 3.7	72.9 ± 7.3	51.03 - 94.8
STSO-955[e]	soil	10/16/02	Sr-90	1.5 ± 3.0	0.0 ± 0.0	-
STSO-955	soil	10/16/02	U-233/4	166.33 ± 3.8	229 ± 22.9	160.3 - 297.7
STSO-955	soil	10/16/02	U-238	169.76 ± 3.8	220 ± 22.0	154 - 286.0
STSO-955	soil	10/16/02	Zn-65	783.59 ± 6.4	809 ± 80.9	566.3 - 1051.7

[a] Results obtained by Environmental, Inc. ,Midwest Laboratory as a participant in the Department of Energy's Mixed Analyte Performance Evaluation Program, Idaho Operations office, Idaho Falls, Idaho

[b] All results are in Bq/kg or Bq/L as requested by the Department of Energy.

[c] MAPEP results are presented as the known values and expected laboratory precision (1 sigma, 1 determination) and control limits as defined by the MAPEP.

[d] Known activity below the laboratory LLD. The sample was recounted for 2000 minutes; result : 11.52 ± 5.55 Bq /L

[e] Included in the testing series as a "false positive". No activity expected.

TABLE A-7. Environmental Measurements Laboratory Quality Assessment Program (EML)

Lab Code	Type	Date	Concentration[a] Analysis	Laboratory results	EML Result[b]	Control Limits[c]
STW-945	Water	03/01/02	Am-241	1.68 ± 0.14	1.47	0.79 - 1.41
STW-945	Water	03/01/02	Co-60	349.20 ± 2.60	347.33	0.80 - 1.20
STW-945	Water	03/01/02	Cs-134	3.40 ± 0.60	3.36	0.80 - 1.30
STW-945	Water	03/01/02	Cs-137	57.20 ± 1.70	56.07	0.80 - 1.22
STW-945	Water	03/01/02	Pu-238	0.45 ± 0.11	0.49	0.74 - 1.20
STW-945	Water	03/01/02	Pu-239/40	4.47 ± 0.28	4.22	0.79 - 1.20
STW-945	Water	03/01/02	Sr-90	7.40 ± 1.30	7.58	0.69 - 1.34
STW-945	Water	03/01/02	Uranium	3.27 ± 0.43	2.84	0.75 - 1.33
STW-946	Water	03/01/02	Gr. Alpha	265.40 ± 7.70	375.00	0.58 - 1.29
STW-946	Water	03/01/02	Gr. Beta	930.60 ± 12.00	1030.00	0.61 - 1.43
STW-946	Water	03/01/02	H-3	226.30 ± 32.70	283.70	0.78 - 2.45
STSO-947	Soil	03/01/02	Ac-228	55.00 ± 5.50	51.17	0.80 - 1.38
STSO-947	Soil	03/01/02	Am-241	8.30 ± 3.30	10.93	0.65 - 2.28
STSO-947	Soil	03/01/02	Bi-212	49.20 ± 12.40	53.43	0.50 - 1.34
STSO-947	Soil	03/01/02	Bi-214	46.60 ± 3.10	53.93	0.78 - 1.42
STSO-947	Soil	03/01/02	Cs-137	1401.60 ± 9.10	1326.67	0.80 - 1.25
STSO-947	Soil	03/01/02	K-40	613.10 ± 28.10	621.67	0.80 - 1.32
STSO-947	Soil	03/01/02	Pb-212	51.60 ± 2.60	51.10	0.78 - 1.32
STSO-947	Soil	03/01/02	Pb-214	52.00 ± 3.60	54.37	0.76 - 1.46
STSO-947	Soil	03/01/02	Pu-239/40	14.70 ± 3.50	19.10	0.71 - 1.30
STSO-947	Soil	03/01/02	Sr-90	52.10 ± 6.30	53.76	0.67 - 2.90
STSO-947	Soil	03/01/02	Th-234	122.40 ± 6.30	89.30	0.63 - 2.35
STSO-947	Soil	03/01/02	Uranium	143.40 ± 9.40	194.77	0.71 - 1.32
STVE-948	Vegetation	03/01/02	Am-241	3.10 ± 2.20	2.23	0.73 - 2.02
STVE-948	Vegetation	03/01/02	Cm-244	0.90 ± 0.80	1.32	0.61 - 1.59
STVE-948	Vegetation	03/01/02	Co-60	13.50 ± 2.10	11.23	0.80 - 1.44
STVE-948	Vegetation	03/01/02	Cs-137	350.40 ± 6.30	313.67	0.80 - 1.31
STVE-948	Vegetation	03/01/02	K-40	940.80 ± 45.60	864.33	0.79 - 1.39
STVE-948[d]	Vegetation	03/01/02	Pu-239/40	16.90 ± 0.70	3.54	0.69 - 1.31
STVE-948	Vegetation	03/01/02	Sr-90	543.40 ± 24.90	586.28	0.55 - 1.21
STAP-949	Air Filter	03/01/02	Am-241	0.09 ± 0.05	0.09	0.70 - 2.34
STAP-949	Air Filter	03/01/02	Co-60	30.10 ± 0.30	30.52	0.80 - 1.26
STAP-949	Air Filter	03/01/02	Cs-137	29.90 ± 0.30	28.23	0.80 - 1.32
STAP-949	Air Filter	03/01/02	Mn-54	40.40 ± 0.40	38.53	0.80 - 1.35
STAP-949	Air Filter	03/01/02	Pu-238	0.05 ± 0.02	0.06	0.67 - 1.33
STAP-949	Air Filter	03/01/02	Pu-239/40	0.15 ± 0.02	0.19	0.73 - 1.26
STAP-949	Air Filter	03/01/02	Sr-90	3.40 ± 0.40	4.83	0.53 - 1.84
STAP-949	Air Filter	03/01/02	Uranium	0.80 ± 0.20	0.61	0.79 - 2.10
STAP-950	Air Filter	03/01/02	Gr. Alpha	0.43 ± 0.04	0.53	0.73 - 1.43
STAP-950	Air Filter	03/01/02	Gr. Beta	1.34 ± 0.05	1.30	0.76 - 1.36
STW-959	Water	09/01/02	Am-241	3.00 ± 0.10	3.04	0.79 - 1.41
STW-959	Water	09/01/02	Co-60	258.40 ± 2.30	268.67	0.80 - 1.20
STW-959	Water	09/01/02	Cs-134	50.80 ± 3.30	60.20	0.80 - 1.30
STW-959	Water	09/01/02	Cs-137	80.10 ± 0.30	81.43	0.80 - 1.22
STW-959	Water	09/01/02	Cs-137	80.10 ± 0.30	81.43	0.80 - 1.22
STW-959	Water	09/01/02	Am-241	3.00 ± 0.10	3.04	0.79 - 1.41

TABLE A-7. Environmental Measurements Laboratory Quality Assessment Program (EML)[a].

			Concentration[b]			
Lab Code	Type	Date	Analysis	Laboratory results	EML Result[c]	Control Limits[d]
STW-959	Water	09/01/02	Am-241	3.00 ± 0.10	3.04	0.79 - 1.41
STW-959	Water	09/01/02	Co-60	258.40 ± 2.30	268.67	0.80 - 1.20
STW-959	Water	09/01/02	Cs-134	50.80 ± 3.30	60.20	0.80 - 1.30
STW-959	Water	09/01/02	Cs-137	80.10 ± 0.30	81.43	0.80 - 1.22
STW-959	Water	09/01/02	H-3	271.90 ± 20.90	227.30	0.78 - 2.45
STW-959	Water	09/01/02	Pu-238	4.40 ± 0.20	4.33	0.74 - 1.20
STW-959	Water	09/01/02	Pu-239/40	2.10 ± 0.10	2.07	0.79 - 1.20
STW-959	Water	09/01/02	Sr-90	9.70 ± 0.20	8.69	0.69 - 1.34
STW-959	Water	09/01/02	Uranium	5.60 ± 0.10	6.84	0.75 - 1.33
STW-960	Water	09/01/02	Gr. Alpha	204.90 ± 3.20	210.00	0.58 - 1.29
STW-960	Water	09/01/02	Gr. Beta	852.00 ± 26.50	900.00	0.61 - 1.43
STSO-961	Soil	09/01/02	Ac-228	47.60 ± 1.90	42.30	0.80 - 1.38
STSO-961	Soil	09/01/02	Am-241	7.80 ± 1.40	6.77	0.65 - 2.28
STSO-961	Soil	09/01/02	Bi-212	45.60 ± 1.70	45.93	0.50 - 1.34
STSO-961[e]	Soil	09/01/02	Bi-214	48.80 ± 4.90	33.63	0.78 - 1.42
STSO-961	Soil	09/01/02	Cs-137	819.60 ± 16.60	829.33	0.80 - 1.25
STSO-961	Soil	09/01/02	K-40	705.30 ± 31.40	637.67	0.80 - 1.32
STSO-961	Soil	09/01/02	Pb-212	48.60 ± 3.40	43.43	0.78 - 1.32
STSO-961	Soil	09/01/02	Pb-214	51.10 ± 5.10	35.20	0.76 - 1.46
STSO-961[f]	Soil	09/01/02	Pu-239/40	20.20 ± 0.80	12.90	0.71 - 1.30
STSO-961	Soil	09/01/02	Sr-90	38.50 ± 0.10	41.16	0.67 - 2.90
STSO-961[g]	Soil	09/01/02	Uranium	58.90 ± 0.70	87.21	0.71 - 1.32
STVE-962	Vegetation	09/01/02	Am-241	2.10 ± 0.30	2.25	0.73 - 2.02
STVE-962	Vegetation	09/01/02	Cm-244	1.00 ± 0.30	1.25	0.61 - 1.59
STVE-962	Vegetation	09/01/02	Co-60	11.80 ± 1.50	9.66	0.80 - 1.44
STVE-962	Vegetation	09/01/02	Cs-137	340.30 ± 16.80	300.67	0.80 - 1.31
STVE-962	Vegetation	09/01/02	K-40	1646.00 ± 74.40	1480.00	0.79 - 1.39
STVE-962	Vegetation	09/01/02	Pu-239/40	3.00 ± 0.30	3.43	0.69 - 1.31
STVE-962	Vegetation	09/01/02	Sr-90	345.60 ± 97.80	476.26	0.55 - 1.21
STAP-963[h]	Air Filter	09/01/02	Am-241	0.20 ± 0.01	0.19	0.70 - 2.34
STAP-963	Air Filter	09/01/02	Co-60	24.90 ± 0.60	23.00	0.80 - 1.26
STAP-963	Air Filter	09/01/02	Cs-137	38.00 ± 1.30	32.50	0.80 - 1.32
STAP-963	Air Filter	09/01/02	Mn-54	60.80 ± 1.90	52.20	0.80 - 1.35
STAP-963[h]	Air Filter	09/01/02	Pu-238	0.11 ± 0.02	0.12	0.67 - 1.33
STAP-963[h]	Air Filter	09/01/02	Pu-239/40	0.21 ± 0.01	0.21	0.73 - 1.26
STAP-963	Air Filter	09/01/02	Sr-90	5.20 ± 0.20	5.56	0.53 - 1.84
STAP-963[h]	Air Filter	09/01/02	Uranium	0.41 ± 0.04	0.47	0.79 - 2.10
STAP-964	Air Filter	09/01/02	Gr. Alpha	0.40 ± 0.10	0.29	0.73 - 1.43
STAP-964	Air Filter	09/01/02	Gr. Beta	0.80 ± 0.10	0.87	0.76 - 1.36

[a] Results are reported in Bq/L with the following exceptions: Air Filters (Bq/Filter), Soil and Vegetation (Bq/kg).

[b] The EML result listed is the mean of replicate determinations for each nuclide ± the standard error of the mean.

[c] Control limits are reported by EML as the ratio of Reported Value / EML value.

[d] An error was found in the conversion from pCi/g to Bq/kg. Corrected result : 2.84 ± 0.59 Bq/kg.

[e] Naturally-occurring radium daughters are present in the shield background, and a probable cause of the higher bias seen for isotopes of lead and bismuth.

[f] Reporting error.The average result of the triplicate analyses was 14.1± 5.7 Bq/kg.

[g] The analysis was repeated in duplicate; result of reanalysis, 87.05 ± 7.64 Bq/kg.

[h] STAP-963, Calculations for the transuranics analyses (Am-241, Uranium, Pu-238, -239/40) were not converted to Bq/total filter. The data listed is the result of recalculation.

APPENDIX B

DATA REPORTING CONVENTIONS

Data Reporting Conventions

1.0. All activities, except gross alpha and gross beta, are decay corrected to collection time or the end of the collection period.

2.0. Single Measurements

Each single measurement is reported as follows: $x \pm s$

where: x = value of the measurement;

s = 2s counting uncertainty (corresponding to the 95% confidence level).

In cases where the activity is less than the lower limit of detection L, it is reported as: <L,

where L = the lower limit of detection based on 4.66s uncertainty for a background sample.

3.0. Duplicate analyses

3.1 Individual results: For two analysis results; $x_1 \pm s_1$ and $x_2 \pm s_2$

Reported result: $x \pm s$; where $x = (1/2)(x_1 + x_2)$ and $s = (1/2)\sqrt{s_1^2 + s_2^2}$

3.2. Individual results: $<L_1$, $<L_2$ Reported result: <L, where L = lower of L_1 and L_2

3.3. Individual results: $x \pm s$, <L Reported result: $x \pm s$ if $x \geq L$; <L otherwise.

4.0. Computation of Averages and Standard Deviations

4.1 Averages and standard deviations listed in the tables are computed from all of the individual measurements over the period averaged; for example, an annual standard deviation would not be the average of quarterly standard deviations. The average $\bar{x}$ and standard deviation s of a set of n numbers $x_1, x_2 \ldots x_n$ are defined as follows:

$$\bar{x} = \frac{1}{n} \Sigma x \qquad s = \sqrt{\frac{\Sigma (x - \bar{x})^2}{n-1}}$$

4.2 Values below the highest lower limit of detection are not included in the average.

4.3 If all values in the averaging group are less than the highest LLD, the highest LLD is reported.

4.4 If all but one of the values are less than the highest LLD, the single value x and associated two sigma error is reported.

4.5 In rounding off, the following rules are followed:

4.5.1. If the number following those to be retained is less than 5, the number is dropped, and the retained number s are kept unchanged. As an example, 11.443 is rounded off to 11.44.

4.5.2. If the number following those to be retained is equal to or greater than 5, the number is dropped and the last retained number is raised by 1. As an example, 11.445 is rounded off to 11.45.

APPENDIX C

Maximum Permissible Concentrations

of Radioactivity in Air and Water

Above Background in Unrestricted Areas

Table C-1. Maximum permissible concentrations of radioactivity in air and water above natural background in unrestricted areas[a].

	Air (pCi/m^3)		Water (pCi/L)
Gross alpha	1×10^{-3}	Strontium-89	8,000
Gross beta	1	Strontium-90	500
Iodine-131[b]	2.8×10^{-1}	Cesium-137	1,000
		Barium-140	8,000
		Iodine-131	1,000
		Potassium-40[c]	4,000
		Gross alpha	2
		Gross beta	10
		Tritium	1×10^6

a Taken from Table 2 of Appendix B to Code of Federal Regulations Title 10, Part 20, and appropriate footnotes. Concentrations may be averaged over a period not greater than one year.

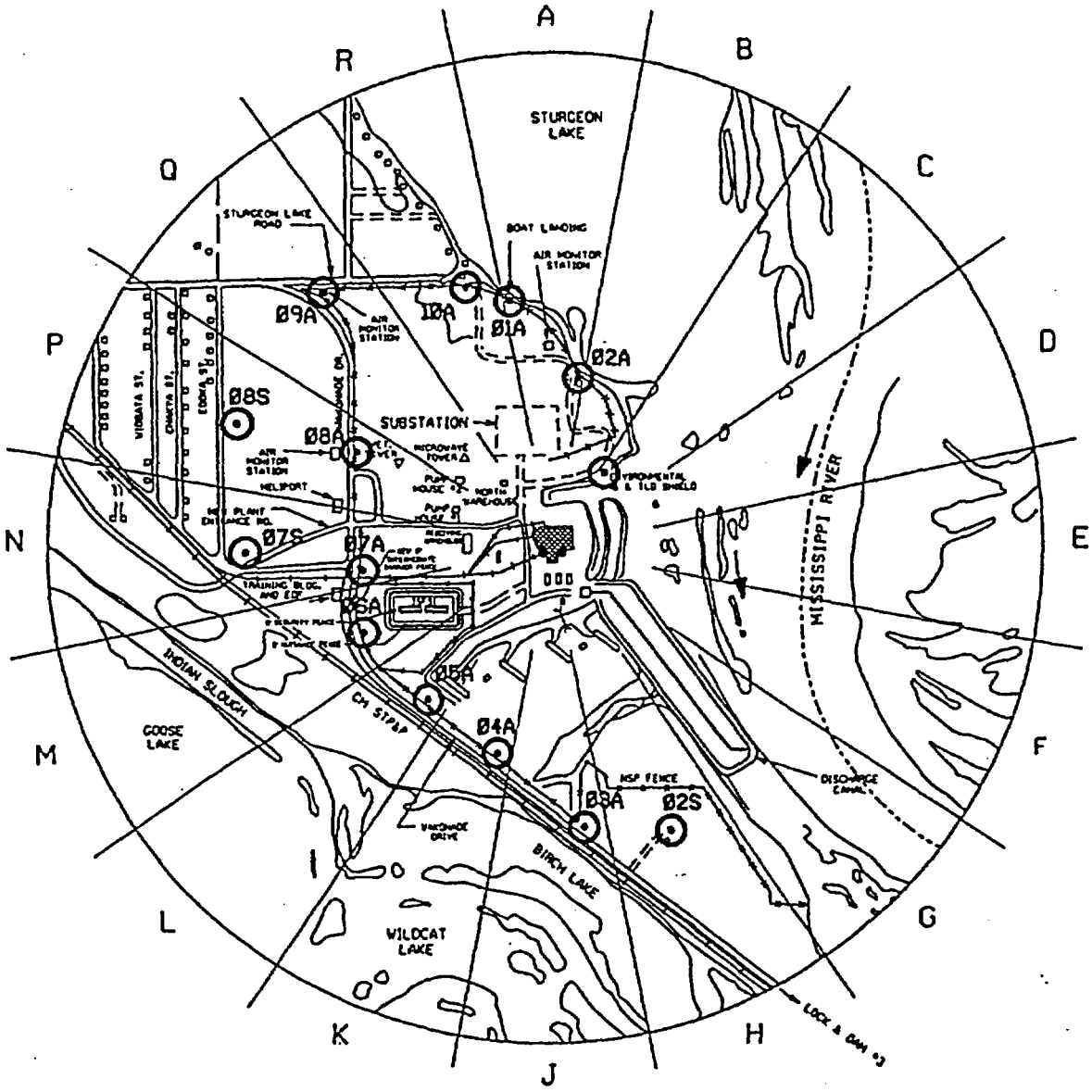
b Value adjusted by a factor of 700 to reduce the dose resulting from the air-grass-cow-milk-child pathway.

c A natural radionuclide.

APPENDIX D

Sampling Location Maps

TLD LOCATIONS
ONE MILE RADIUS



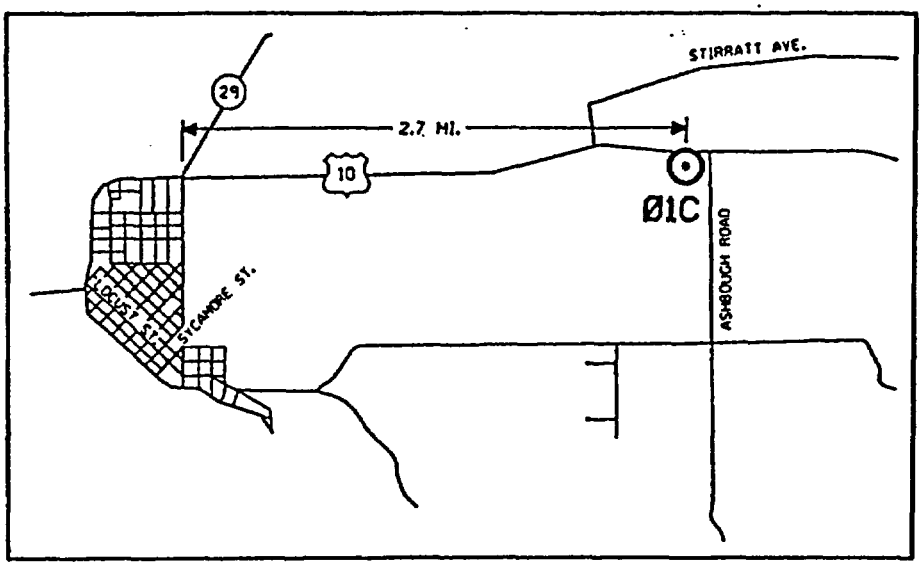
PLANT AREA ENLARGED PLAN [1.00 MILE RADIUS]
[NO SCALE]

MONITORING LEGEND:

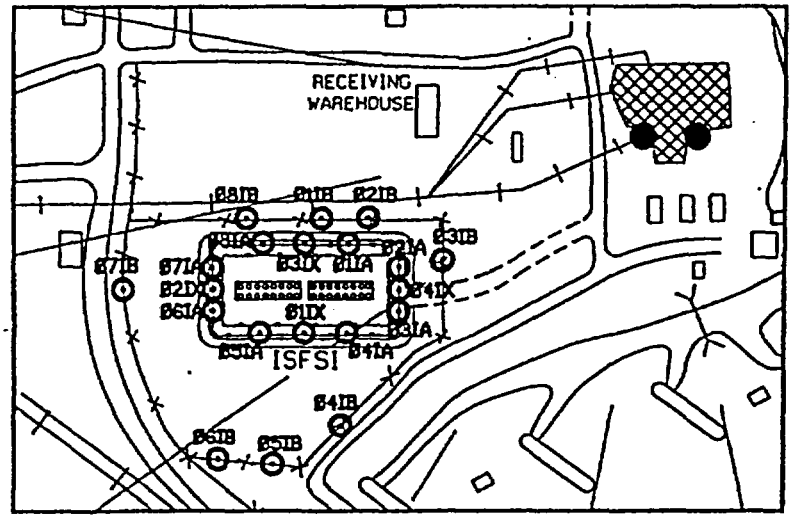
⊙ N.S.P. TLD POINTS

TLD01.DGN

TLD LOCATIONS



CONTROL POINTS
PRESCOTT, WISCONSIN



ISFSI AREA TLD LOCATIONS

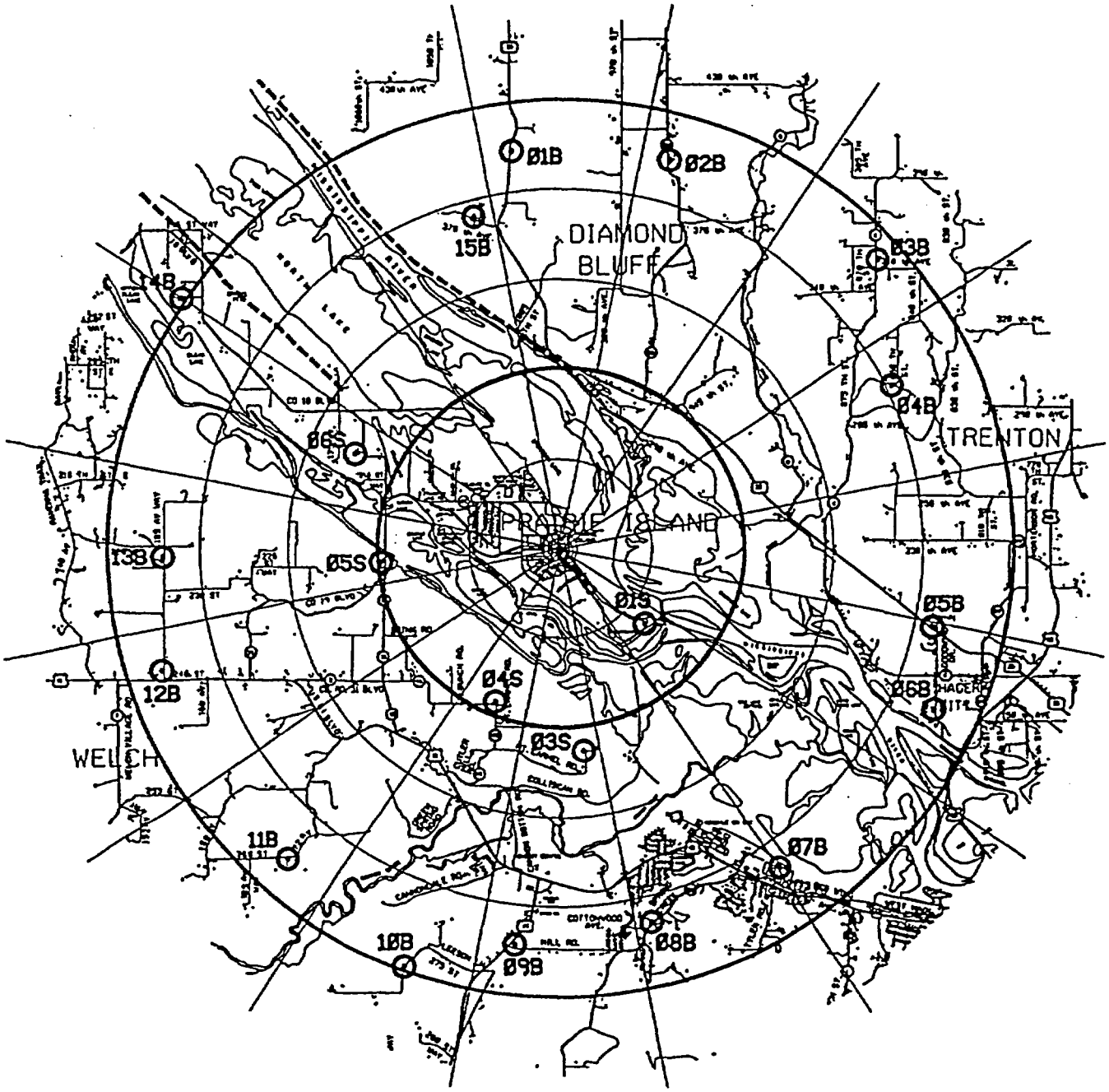
MONITORING LEGEND:

⊙ N.S.P. TLD POINTS

TLD02.DGN

TLD LOCATIONS

FIVE MILE RADIUS

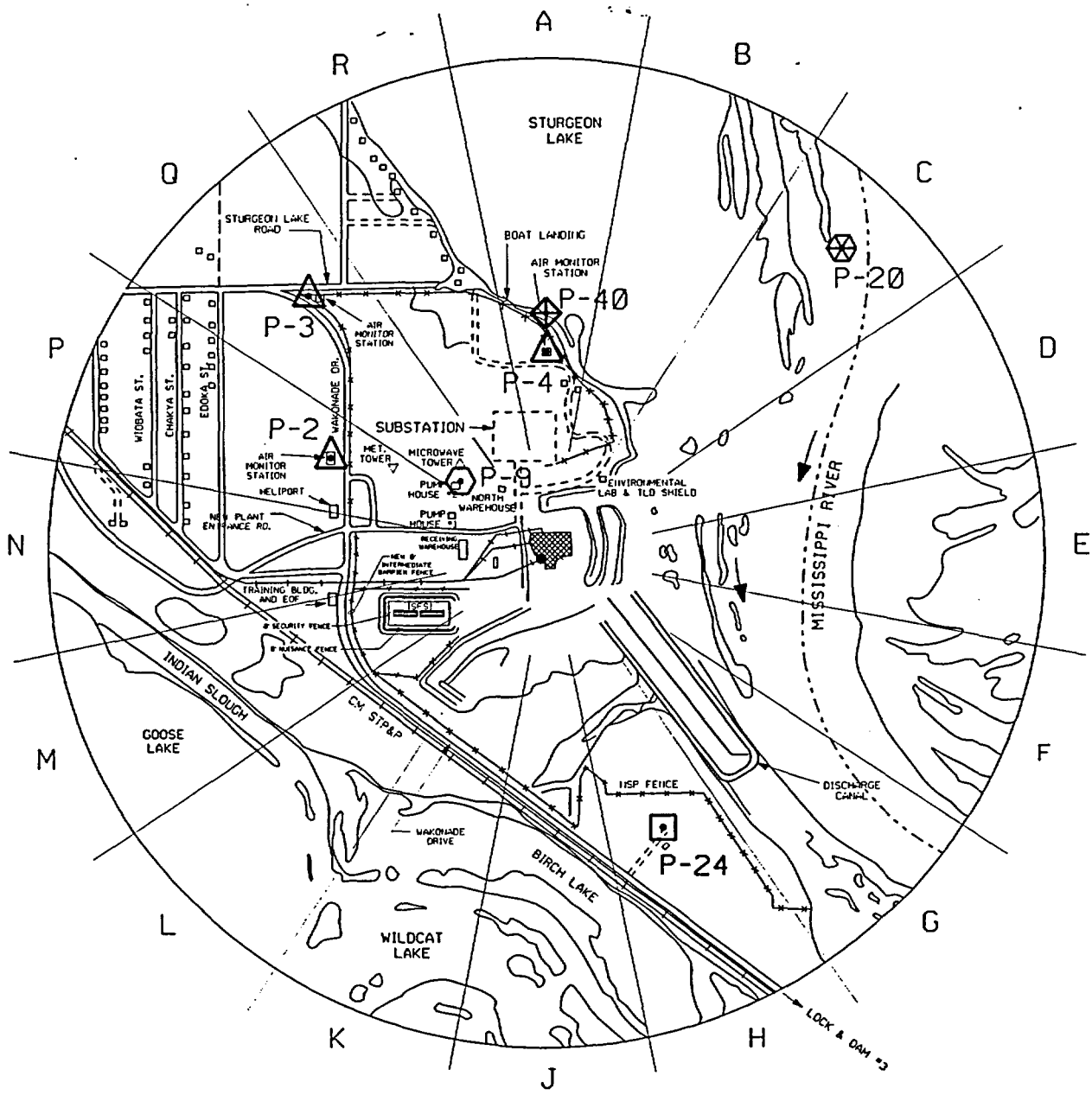


MONITORING LEGEND:

⊙ N.S.P. TLD POINTS

TLDØ3.DGN

ENVIRONMENTAL SAMPLING POINTS
ONE MILE RADIUS



PLANT AREA ENLARGED PLAN [1.00 MILE RADIUS]

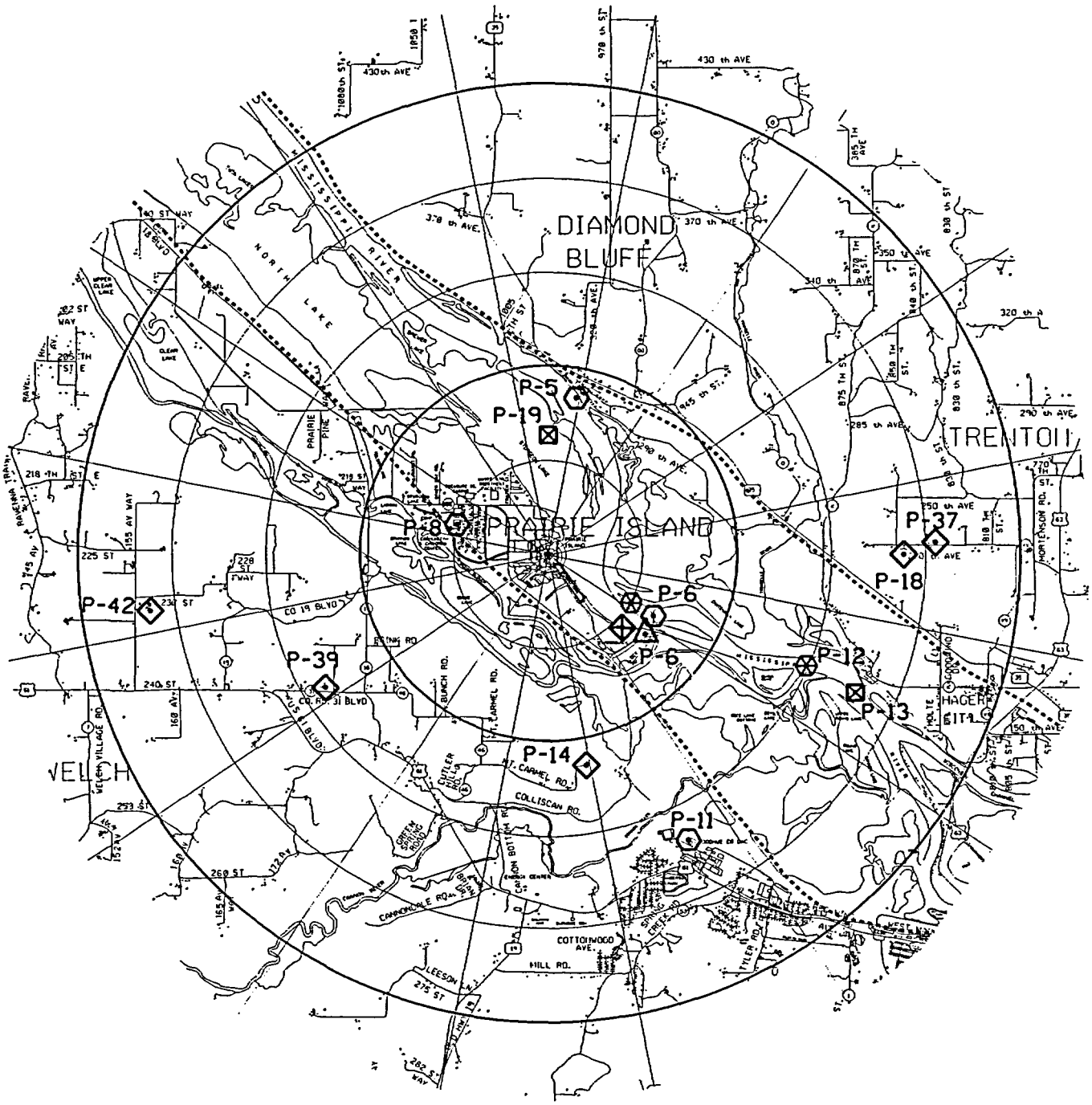
[NO SCALE]

MONITORING LEGEND

- MILK SAMPLING POINT ID NUMBERS
  P-14, P-18, P-25, P-37, P-39, P-41, P-42
- AIR SAMPLING POINT ID NUMBERS
  P-1, P-2, P-3, P-4, P-6
- WATER SAMPLING POINT ID NUMBERS
  P-5, P-6, P-8, P-9, P-11, P-25
- VEGETATION / VEGETABLES ID NUMBERS
  P-24, P-38
- FISH SAMPLING POINT ID NUMBERS
  P-13, P-19
- INVERTEBRATES POINT ID NUMBERS
  P-6, P-40
- SEDIMENT SAMPLING POINT ID NUMBERS
  P-6, P-12, P-20

SAMP01.DGN

ENVIRONMENTAL SAMPLING POINTS
FIVE MILE RADIUS

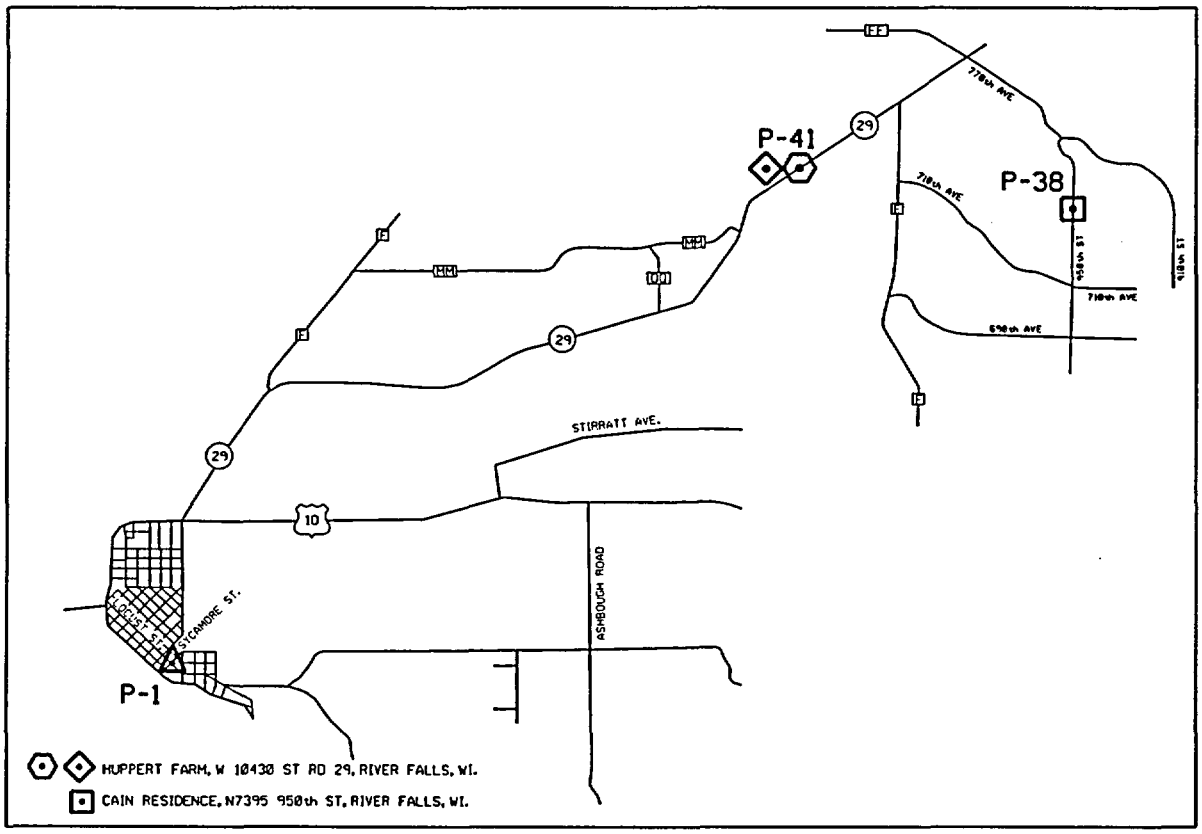


MONITORING LEGEND

- MILK SAMPLING POINT ID NUMBERS P-14, P-18, P-25, P-37, P-39, P-41, P-42
- FISH SAMPLING POINT ID NUMBERS P-13, P-19
- AIR SAMPLING POINT ID NUMBERS P-1, P-2, P-3, P-4, P-6
- INVERTEBRATES POINT ID NUMBERS P-6, P-40
- WATER SAMPLING POINT ID NUMBERS P-5, P-6, P-8, P-9, P-11, P-25
- SEDIMENT SAMPLING POINT ID NUMBERS P-6, P-12, P-20
- VEGETATION / VEGETABLES ID NUMBERS P-24, P-38

SAMP03.DGN

ENVIRONMENTAL SAMPLING POINTS



CONTROL POINTS
PRESCOTT, WISCONSIN

MONITORING LEGEND

- MILK SAMPLING POINT ID NUMBERS
  P-14, P-18, P-25, P-37, P-39, P-41, P-42
- AIR SAMPLING POINT ID NUMBERS
  P-1, P-2, P-3, P-4, P-6
- WATER SAMPLING POINT ID NUMBERS
  P-5, P-6, P-8, P-9, P-11, P-25
- VEGETATION / VEGETABLES ID NUMBERS
  P-24, P-38

SAMP02.DGN